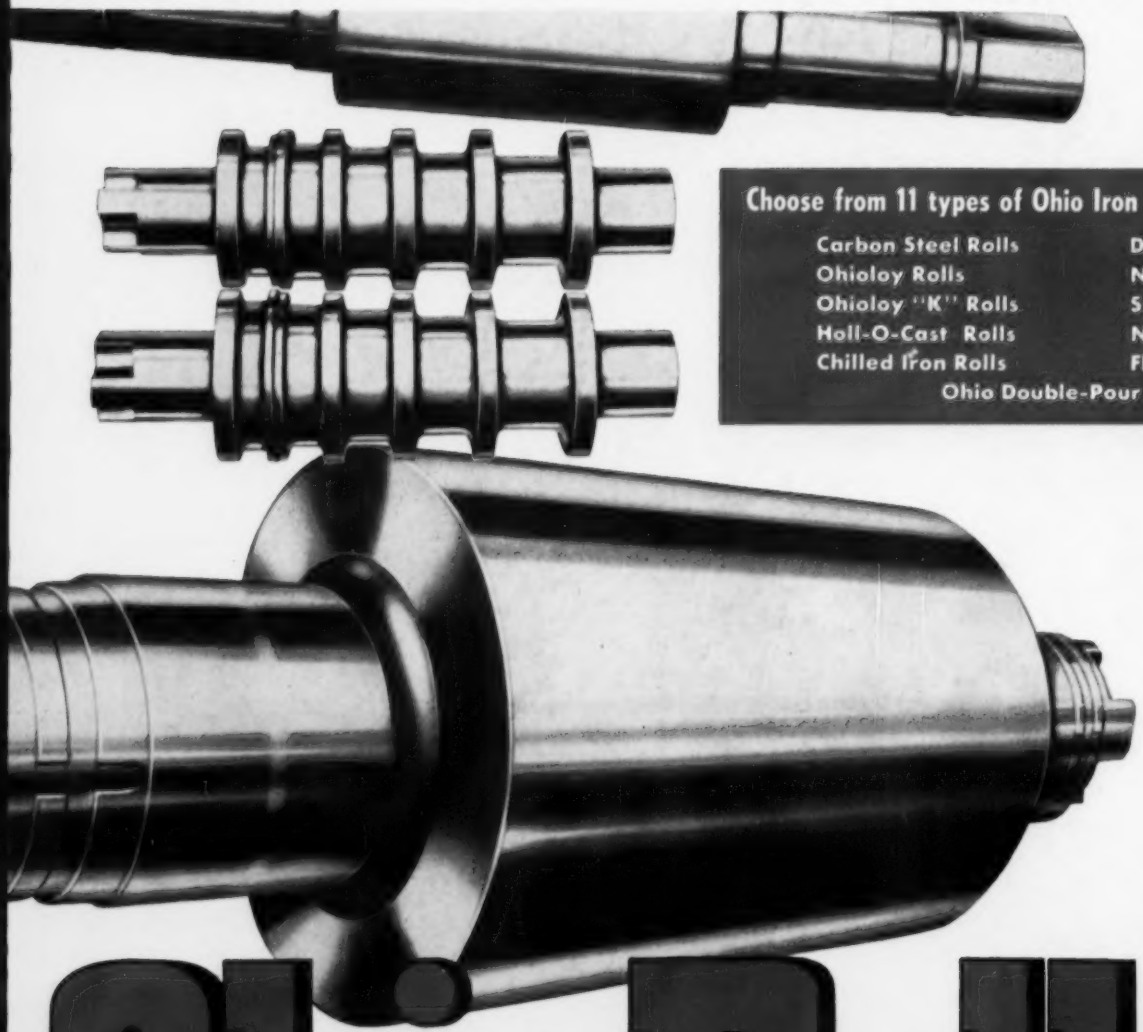
the Iron Age

A Chilton Publication

THE NATIONAL METALWORKING WEEKLY • OCTOBER 27, 1955

Small business in action— a closeup. See page 35



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Crafts and craftsmen through the ages

NUMBER FOUR OF A SERIES

Enlargements of illustrations available upon request.

Basic Refractories not only furnishes its customers with the finest refractories available, but also employs skilled craftsmen —men with practical steelmaking experience— to insure that the use of these products gives full value.

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REFRACTORIES ENGINEERING AND SUPPLIES, LTD. — EXCLUSIVE CANADIAN AGENTS

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Home-builders today are turning more and more to the relatively new and economical radiant baseboard system of heating. Just in the past five years the use of radiant baseboard has multiplied several times over. And a principal material in radiant baseboard heating is sheet steel.

Bethlehem supplies much of the sheet steel that goes into this new kind of home-heating system, as well as for the familiar warm-air ductwork. But the installation of heating systems is only one of many activities whose consumption of Bethlehem sheets has grown tremendously in recent years.

Room air-conditioners, television cabinets, galvanized steel products, agricultural machinery, ironing boards — these and many other items are enjoying a recent upsurge in popularity. A popularity accounted for in no small measure by the strength and workability of steel sheets.

Meanwhile, the demands of longer established sheet users continue apace. All of which makes it easier to understand why Bethlehem is being called on to produce hot- and cold-rolled sheets in larger volume than ever before. We are making every effort to overtake the unprecedented demand.

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BETHLEHEM SHEETS

BETHLEHEM STEEL

the iron Age

DIGEST OF THE WEEK

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NEWS DEVELOPMENTS

MODERN METHODS PAY OFF AT SMALL COMPANY—P. 35
Local teachers visit a young New Jersey company to see how industry operates. They find management laying great stress on high pay, profit sharing and permanent employment. Sales operations feature minimum of paperwork. Production scheduling is big problem. New budget control brings big savings.

INDUSTRY WATCHES SUB REFERENDUM IN OHIO—P. 37
SUB principle tied in with fat increase in state unemployment compensation payments in Ohio proposal. Tie-in clouds issue, but brings full force of labor and industry to bear in campaign. Governor Lausche calls proposal "fantastic." Ohio approval needed to cover two thirds majority of auto workers included in new contracts between automakers and UAW.

FARM INCOME DOWN DESPITE U. S. BOOM — P. 41
National income is up. Industrial production is up. In fact, just about everything is up in this country's rising economy with the lone exception of farm income. From 1951-1953 farm parity was down 19 pct. It has dropped another nine pct since then. It is right now headed for its lowest point since World War II.

RELIGION AND WORK SHOULD GO TOGETHER — P. 42
Congress of industry, labor, government, and education leaders proves that there's more to work than material reward. Benedictine rule of work and study for God cited. Conferees believe that we are now in a phase where work again shows promise of entering a spiritual stage. Proceedings will be published in book form to assure widespread distribution.

HOW MUCH DO PLANT ACCIDENTS COST YOU?—P. 43
Last year, on-the-job accidents cost U. S. industry a cool $3.2 billion, hit 1.8 million workers. To help you counter this perpetual, costly headache, the National Safety Congress cites some do's and don'ts aimed at saving you real money, clarifying your position regarding worker injury claims.

DEFENSE SPENDING WON'T DROP NEXT YEAR — P. 57
Defense Sec. Wilson is telling the Administration to look elsewhere for budget cuts. Defense Dept. costs won't go down; probably will be higher. Rising material costs, service pay hikes and the jet bomber program are among reasons for continued fat budget. Armed strength will stay about the same.

IN METALWORKING

ENGINEERING & PRODUCTION

MELT SUPERALLOYS FOR BETTER FORGINGS — P. 75
A new development in melting superalloys marks another advance in the fast growing field of vacuum metallurgy. These highly important materials are now being arc melted under vacuum, using consumable electrodes. Impressive results claimed include cleaner, larger ingots to 2000 lb now, 4000 lb in near future.

TUBE-FORMING METHODS SIMPLIFY ASSEMBLY—P. 78
Round, thin-walled metal tubing is excellent for building strong, lightweight structures. But the problem of attaching tube ends to other structural parts often restricts ideal tubular designs. Airframe manufacturers lick these problems by spinning, swaging, impacting, extruding, and gathering tubing to help eliminate inefficient joining methods.

TITANIUM EXTRUSION—A NEW TECHNIQUE — P. 81
Successful extrusion of titanium greatly extends the metal's usefulness to industry. It helps cut costs by conserving expensive material and eliminating difficult machining. As a process, it was developed from systematic, painstaking research. A major titanium extrusion program now provides authoritative, down-to-earth information on this important development.

MEASURE FORCES TO AVOID BOLT OVERLOADING—P. 85
Magnetic forces of about 2-million lb must be held by high-strength bolts used in the modified cyclotron at the University of California's Radiation Laboratory. To overcome dangerous tendencies, pole plate bolts are preloaded. A special sensing element measures the full-size forces not obtainable from a scale model.

FLAME PLATING GIVES CLADS BETTER WEAR — P. 88
Flame plating applies a tough, wear-resistant surface. Tools, gages, bearing surfaces are among many successful applications. A flame-plated plug gage is claimed to outlast tungsten carbide 3 to 1. The process is extremely flexible, has many applications.

MARKETS & PRICES

APPLIANCE SALES SOAR TOWARD NEW PEAKS—P. 38
This year should set new highs in sales for the fast growing appliance industry. Next year and for several years to come fabricators of everything from automatic washers to color TV sets expect sales graphs to climb steadily upward. New models annually coupled with a new set of trade-in allowances spell a steadily burgeoning replacement market for years to come.

TINPLATE MAKES IT TWO STRAIGHT RECORDS — P. 39
Shipments during the first three-quarters of 1955 indicate a record year in sight. Tinplate also set a sales record in 1954 despite the fact that over-all steel production was down. Product advantages are the big reason for the records and the reason the outlook is so good for future tinplate sales.

LOCOMOTIVE BUILDING COMES BACK STRONG—P. 40
Boom in railroad business caught roads low on rolling stock. Locomotive builders, faced with nearly complete dieselization of roads, had cut back shops. New boom will last into 1956. After that, remanufacturing and maintenance will provide bulk of new business.

STATION WAGONS CLIMB IN POPULARITY — P. 52
Trends to suburban living, larger families, make station wagons gain in demand. Production among leading automakers climbs. Hardtops also make big inroads on conventional four and two-door sedan models. Manufacturing improvements make it more practical for producers to vary body styles. Station wagons will account for almost 10 pct of the market.

STEEL MARKET SUPPORTS PREMIUM PRICES — P. 115
One of tightest steel markets in history is forcing consumers to pay warehouse and premium prices. The premium price is more prevalent than generally believed. Further, more steel users are using or trying to line up expensive conversion deals.

NEXT WEEK:

SEMI-AUTOMATIC LINE SPEEDS TANK PRODUCTION
Production of auxiliary fuel tanks for aircraft moves on a fast cycle at Los Angeles' Patushin Aviation Corp. Operations include forming, welding and machining on three aluminum sections before final assembly. All of the major tank fabrication and assembly areas are tied together by an efficient conveyer system.

WHAT'S THE INDUSTRIAL TELEVISION PICTURE?
Can television be put to work in your plant? Before you answer, better read next week's special report. Story tells how TV is being used now in industry, what the manufacturers are planning, what future applications may be. Costs, servicing, lighting are some of the points covered in TV roundup.

JEFFREY CHAIN... A QUALITY PRODUCT

"Don't let the work-horse appearance of chain fool you", said an important buyer of power transmission equipment. "Chain is a precision product. And Jeffrey gives us that precision."

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Jeffrey Chain is designed for maximum strength with minimum weight. Jeffrey Sprockets and Chain make an excellent combination, giving full bearing contact without play or binding. They assure most efficient use of power and long life for power transmission and conveying equipment.

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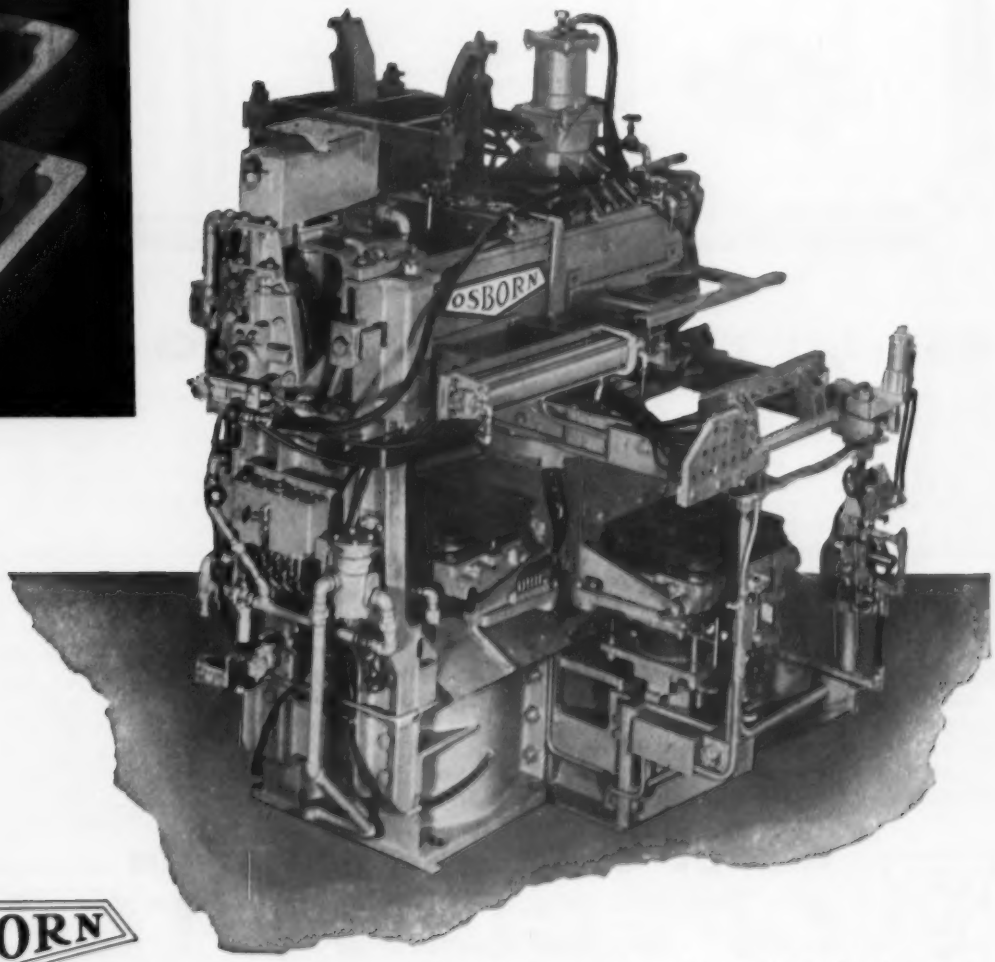

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Armco Zincgrip Tubing is made in outside diameters of ⅜-inch through 3 inches, with wall thicknesses of 20 gage through 12 gage. For information and prices, just fill out the coupon and mail it to us.

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Indexed in the Industrial Arts Index and the Engineering Index.

EPA NBP

October 27, 1955

Editorial:

Are You Wasting Manpower?

◆ LABOR SHORTAGE is the rule today. It may be that way for some time. There is a shortage of engineers, secretaries, intelligent clerks, production experts—and top level executives.

More people will be hired—if they can be swiped from some other company. Others will be promoted from the ranks. Rough diamonds will be polished; and the pay checks will be raised.

Some shortages might be alleviated by eliminating wasted manpower. Let's pretend we are checking up on possible manpower waste in the upper levels:

President and vice presidents: Are they doing the work of the others? Do they go into detail too much? Are they spending enough time taking care of the broad policies of the company? Do they inspire leadership in those around them?

Purchasing Agents: Are they allowed to exercise their own wisdom and experience without top level, over-the-shoulder scrutiny? Is their advice listened to? Do they take time to read and digest what is going on in their industry? Are they relieved from doing 2x2=4?

Engineers: Are many of these people being hoarded for a future need? Are they doing kid's work when they ought to be doing a man's job? Are clerks or others taking some of the ordinary detail from them; thus freeing them for real engineering projects?

Production Manager: Is he oversupervised? Is he allowed to go on his own enough? Is he kept advised on what is happening in the front office? Does he train his foremen so they can do the best job possible? Are you making a high paid clerk out of him with forms and fancy surveys?

You: Are you taking advantage of your opportunities? Do you believe working a little more than you're expected to pays off? Are you sure the spellbinder wins out? Are you ready for the next job? Do you know how to be happy at your job?

These questions may be old hat to you. But each proper answer could mean more efficiency and less wasted executive manpower for you. Besides, only from the ranks will you find top level potential. You will need all you can find in the next few years.

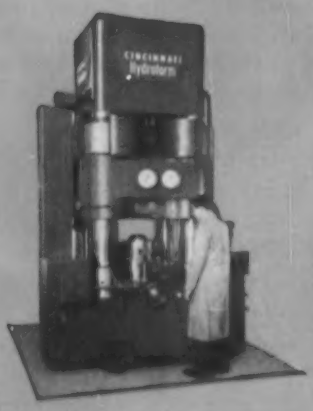
Tom Campbell

EDITOR-IN-CHIEF

two more examples of time and tool cost savings by Hydroforming

▲ PART A: Hydroformed in one operation from a 23″ dia. blank of 0.051″ aluminum.

PART B: Hydroformed in one operation from a 19″ dia. ▼ blank of 0.032″ aluminum.



The parts illustrated represent difficult, multiple-operation draws by conventional methods, using complicated and costly tooling. However, each part was produced in *one* draw by Hydroforming. *Minimum* tool cost was incurred. Part A was produced using a *plastic* punch. Part B was drawn with a *cast aluminum* punch. Two simple steel draw rings were the only other tool elements required. In both cases, finished part samples were submitted for engineering approval after just *two hours* development time on the machine.

Similar savings can be *yours* by Hydroforming. Let a Cincinnati Milling field engineer give you complete details. For a description of the Hydroforming process and specifications of the 8′, 12′, 19′, 23′, 26′ and 32′ machine sizes, write for Bulletin M-1759-3.

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THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO, U.S.A.

dear editor:

letters from readers

Is Russian Boot Pinching?

Sir:

It is again impossible for me to refrain from complimenting you on one of your editorials—this time permit me to say that you have certainly done an old-time job of hitting the nail on the head with your editorial, "Is the Russian Boot Pinching?" in the September 29th issue.

Please send me a number of copies of this editorial for use in my fight against Communism here in Baltimore. *G. D. O'Neill, Asst. to Chief Engineer, The Baltimore & Ohio Railroad Co., Baltimore.*

More Steel for Your $

Sir:

Please send me five copies of the article, "How to get More for Your Steel Dollar," which appeared in your October 6th issue. *G. T. Gustafson, Supervisor Raw Materials Purchasing, Hotpoint Co., Chicago.*

Sir:

Please mail to the attention of the writer eight copies of "How to Get More for your Steel Dollar" in the October 6th issue. This department found this article very instructive and would like to have it in the files of other departments. *S. H. Barber, Asst. Purchasing Agent, Smith-Corona, Inc., Syracuse 1, N. Y.*

We would appreciate receiving six copies of "How to get More for your Steel Dollar." The article is very timely in view of continued rising costs. *F. J. Whitney, Jr., Heintz Manufacturing Co., Philadelphia.*

Copies are still available.—Ed.

"What the Editor Wants"

Sir:

So often your magazine does things which are most helpful to manufacturers. I am certain that your readers appreciate these many thoughtful acts although, being human, they probably neglect to tell you so. It appears to me that you are rendering a definite service to public relations people in making the booklet "What the Editor wants" available to them. If your supply is not exhausted, I will greatly appreciate receiving a copy. *Yandell C. Cline, Vice-President, Arvin Industries, Inc., Columbus, Indiana.*

Sir:

As a constant reader of your fine magazine, I would appreciate receiving a copy of the booklet, "What the Editor wants." *L. E. G. Suiter, General Plant Manager, Fairchild Recording Equipment Co., Whitestone, New York.*

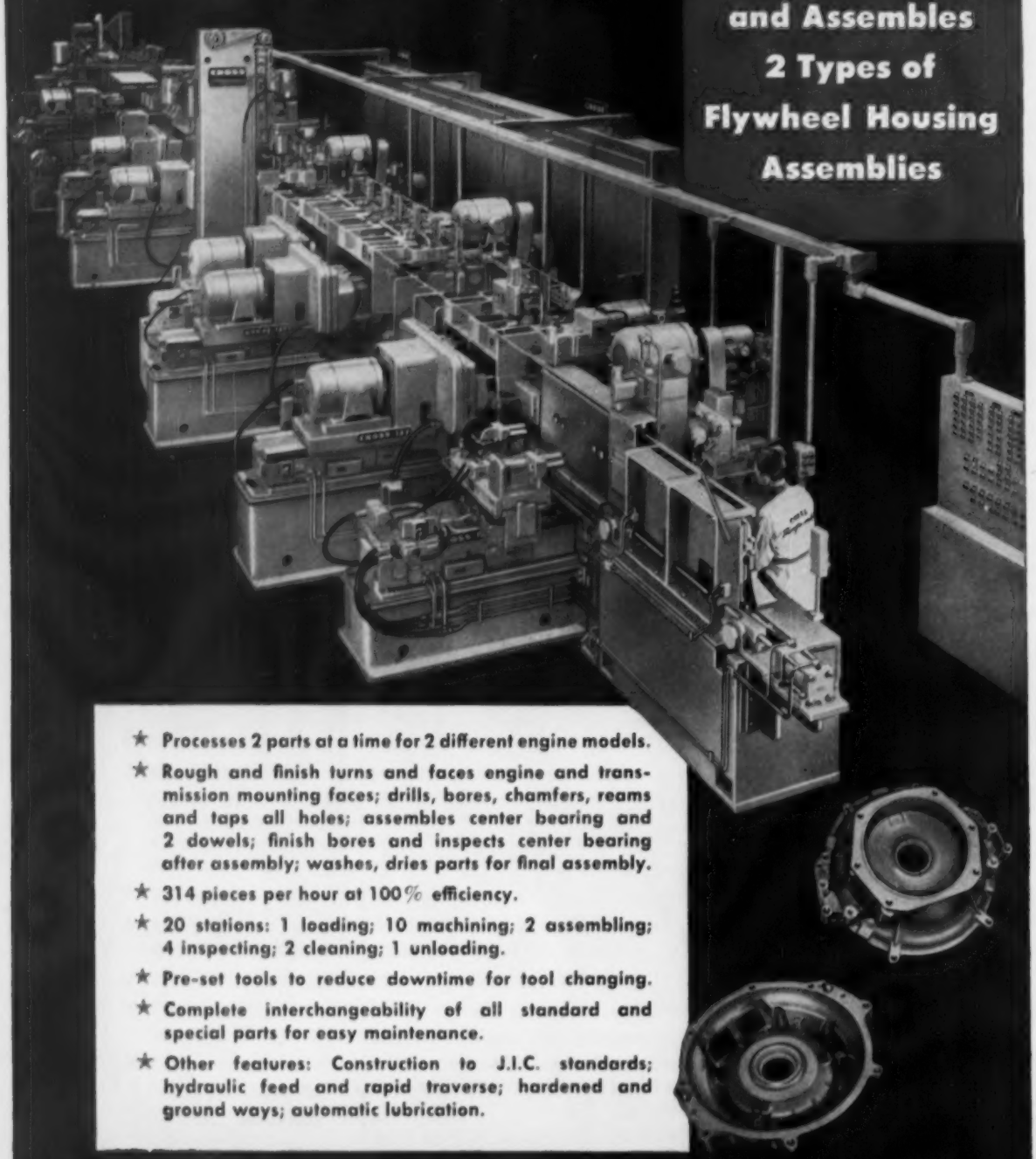
Sir:

Please send me a copy of the little booklet entitled, "What the Editor wants," compiled by the Society of Business Magazine Editors, and mentioned on page 11 of your September 8th issue. *H. W. Graybill, R & I E Equipment Division, I-T-E Circuit Breaker Co., Greensburg, Pa.*

A number of requests for this booklet have come from people who are not primarily in public relations work—though many a PR man has asked for one or more copies. In either case we're happy to send 'em.—Ed.

Another Transfer-matic by Cross

Bores, Faces, Drills and Assembles 2 Types of Flywheel Housing Assemblies



★ Processes 2 parts at a time for 2 different engine models.

★ Rough and finish turns and faces engine and transmission mounting faces; drills, bores, chamfers, reams and taps all holes; assembles center bearing and 2 dowels; finish bores and inspects center bearing after assembly; washes, dries parts for final assembly.

★ 314 pieces per hour at 100% efficiency.

★ 20 stations: 1 loading; 10 machining; 2 assembling; 4 inspecting; 2 cleaning; 1 unloading.

★ Pre-set tools to reduce downtime for tool changing.

★ Complete interchangeability of all standard and special parts for easy maintenance.

★ Other features: Construction to J.I.C. standards; hydraulic feed and rapid traverse; hardened and ground ways; automatic lubrication.

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Special MACHINE TOOLS

fatigue cracks

by William M. Coffey

Advice to the Forlorn

With nothing better to do last week we printed a letter from Mrs. A. B. who was asking some advice about sex training for her little girl of three months. Remember? It went like this:

Question—"We have a baby girl three months old. We would like your views on teaching a child early enough about sex so she will have a proper attitude towards it. I don't want her to think it's cruel or nasty, and yet I don't want her to be too interested."—Mrs. A. B.

We've been flooded with answers. Seems our 23 loyal readers are experts on the subject. Frinstance; *Dear Mrs. A. B.*

You have waited too long already. Rush her to a house of correction for wayward girls. There may still be time for readjustment.

H. F. B.
Baltimore, Md.

* * *

Dear Mrs. A. B.

You are absolutely right to start sex training as soon as possible.

I had a niece once. We waited until she was six months old before acquainting her with the facts. She ran off when she was seven months old and we haven't heard from her since. This tragedy could have been avoided.

N. P. S., Jr.
Chicago, Ill.

* * *

Dear Mrs. A. B.

You certainly have yourself a problem, but congratulations on approaching it so thoughtfully.

How many times have I said that sex is neither cruel or nasty. If there were more people like you in the world, Mrs. A. B., there would be more people in the world.

Interested
Hartford, Conn.

Letters

Just because back in the days when Tom Campbell was the Pittsburgh editor of IRON AGE I was his contemporary as Detroit editor, I am taking the liberty of asking you if you could provide me with a complete set of clippings of "Caleb Flerk's Own Story."

One of the reasons I have to ask you for clippings is that I don't dare clip any of our copies here in the office. If you just as much as cut a corner off a page they feather your prop and wire your trim tabs in the "nose up" position. As Caleb knows, that ain't good.

Sincerely,

W. F. Sherman, Manager
Engineering & Technical Dept.
Automobile Manufacturers Assn.

We'll be happy to send an autographed copy from Caleb himself, when we can find him. He quit the farm, you know, moved to Philadelphia and is now living off his royalties . . . erruh relatives.

Puzzlers

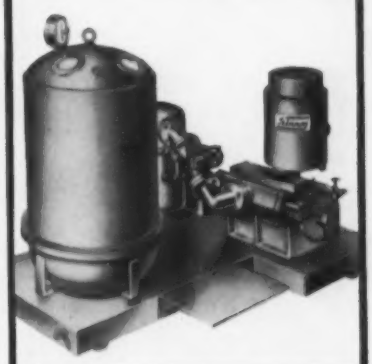
Seems that the answer to Oct. 13 puzzler is A equals 36 and B equals 63 and as C. W. McKinley says it was "simple." Winners: R. H. Taylor, The Vulcan Detinning Co.; Frank K. Remy, Delaware County Engineer; Gerald J. Robinson; Chester and Leo of Automatic Machine Products who telegrammed "Back on Job, Still Too Easy"; J. C. Zurzaki, The Budd Company; George W. Frederick, Republic Steel Corp.; Don Hartman, Solar Steel Corp.; J. William Temple, Lufkin Foundry and Machine Co.; and C. W. McKinley of course.

New Puzzler

Mr. C. Leo Jordan sends us this one.

A farmer has nine pieces of chain, three pieces consisting of three links, three pieces consisting of four links, and three pieces consisting of five links each. If it costs 2¢ a cut and 2¢ a weld, what is the *minimum* cost for connecting the pieces into one piece?

INCREASE PRODUCTION WITH FEWER MELTS

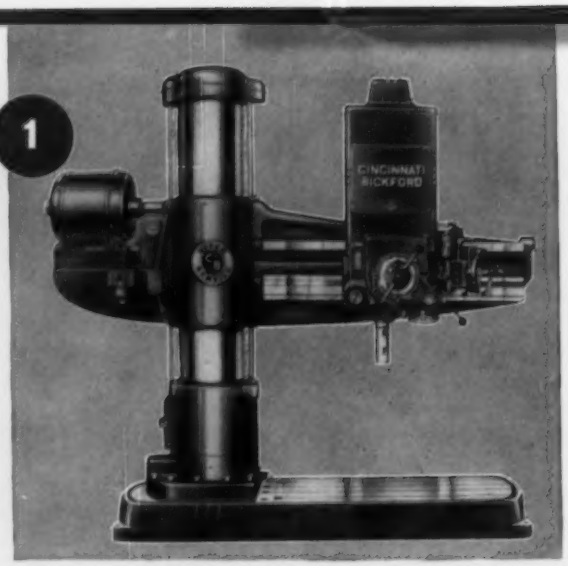


By degassing your melts in a Kinney Mobile Vacuum Degasser gaseous impurities are almost entirely removed . . . metals result which have uniform purity and superior physical properties impossible to produce by ordinary methods. Thus, vacuum degassing will result in fewer rejects from metal failures, less remelting, increased production.

The Kinney Mobile Vacuum Degasser is a rugged, reliable, trouble-free unit designed for constant foundry usage. Simple in operation, the degasser requires no skilled labor. A gas-ballasted Kinney Model KDH-130 vacuum pump provides the rapid pump down required for production operation.

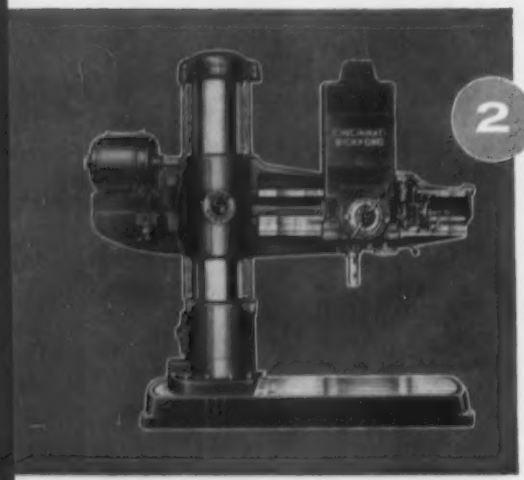
Take rejected melts out of your foundry operation . . . write today for Bulletin 402. Kinney Manufacturing Division, The New York Air Brake Company, 3634 Washington St., Boston 30, Mass.

Kinney



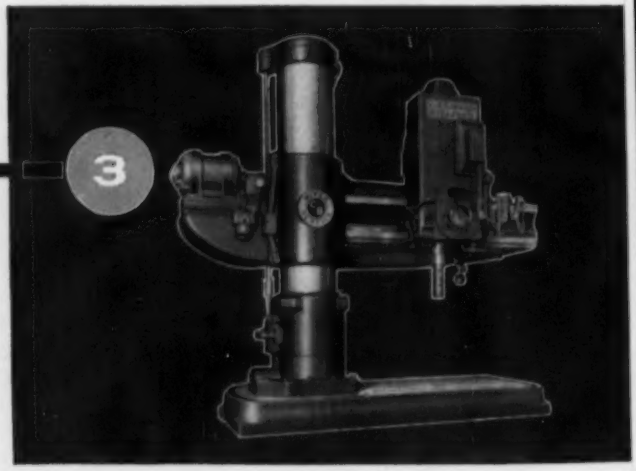
1

New 100% hydraulic pre-selection of all 36 speeds and 18 feeds gives this line of Super-Service Radials maximum performance and ease of handling. A simple prescheduling device shows speeds and feeds to be used on each successive operation and provides a permanent record. Ask for Bulletin R-33.



2

Speed range pre-selector, in conjunction with one speed change lever controls selection of 36 speeds. This new line of Super-Service Radials is for heavy duty work where split-second savings are not so important. Bulletin R-32 gives details.



3

Super-Service Radials with lever shifts for all speed and feed changes are still preferred by many who know the dependable ruggedness of these machines. Write for Booklet R-29.

One of these 3 will do your job BEST---

You have a choice, in Super-Service Radials, as to the extent to which automatic gear shifting and preselection of speeds and feeds will be employed. The highest development is shown at Fig. 1; but for many kinds of heavy duty work, the machine with speed range pre-selector and lever shifts for other changes, is to be preferred. Look at all three—by writing now for latest catalogs.

CINCINNATI
BICKFORD

RADIAL AND UPRIGHT DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio, U.S.A.

Subsidiary of GIDDINGS & LEWIS MACHINE TOOL CO. : Fond Du Lac, Wisconsin.

dates to remember

NOVEMBER

THE MAGNESIUM ASSOCIATION—Annual meeting, Oct. 31-Nov. 1, Hotel Biltmore, New York City. Association headquarters, 122 E. 42nd St., New York.

INVESTMENT CASTING INSTITUTE—Annual meeting, November 1-3, Detroit. Institute headquarters are at 27 East Monroe St., Chicago 3, Ill.

SOCIETY OF BUSINESS MAGAZINE EDITORS — Annual dinner, Nov. 3, Hotel Statler, Washington, D. C. Society headquarters, 1015 National Press Bldg., Washington 4, D. C.

EXPOSITIONS

1955

SECOND INTERNATIONAL AUTOMATION EXPOSITION—Nov. 14-17, Navy Pier, Chicago. Society headquarters are at 845 Ridge Ave., Pittsburgh 12, Pa.

1956

ASTE—Industrial exposition, March 19-23, Chicago.

MATERIALS HANDLING SHOW, June 5-8, Cleveland.

SOCIETY FOR ADVANCEMENT OF MANAGEMENT—Unique S.A.M. measurement of management conference, Nov. 3-4, Hotel Statler, New York City. Society headquarters, 74 Fifth Ave., New York.

SOCIETY OF AUTOMOTIVE ENGINEERS—National fuels and lubricants meeting, Nov. 9-10, Bellevue-Stratford Hotel, Philadelphia. Society headquarters, 29 W. 39th St., New York.

GALVANIZERS COMMITTEE — Fall meeting, Nov. 10 & 11, Drake Hotel, Chicago. Society headquarters, American Zinc Institute, Inc., 60 E. 42nd St., New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS — Annual meeting, Nov. 13-18, Hotel Congress, Conrad Hilton, Sheraton - Blackstone, Chicago. Society headquarters are at 29 W. 39th St., New York.

NATIONAL METAL TRADES ASSN.—55th annual convention, Nov. 14-16, Sheraton-Plaza Hotel, Boston. Society headquarters, 155 E. 44th St., New York.

NATIONAL ELECTRICAL MANUFACTURERS ASSN.—Annual meeting, Nov. 14-18, Traymore Hotel, Atlantic City. Society headquarters, 155 E. 44th St., New York.

THE AMERICAN INSTITUTE OF CHEMICAL ENGINEERS — Annual meeting, Nov. 27-30, Statler Hotel, Detroit, Mich. Society headquarters, 25 W. 45th St., New York.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION—Annual convention, Nov. 28-Dec. 1, Boca Raton, Fla. Institute headquarters, 101 Park Ave., New York.

One of the twelve strapping stations set up by Quaker Export Packaging Co. to handle "Operation Poinsettia."

Signode power machines strap 600,000 cartons of food for export in 30 days!

Start November 14th and package 3,592,500 food parcels for shipment overseas in time for Christmas? It was done—in an amazing demonstration of fast organization and sustained effort, with the parcels packed six to a carton, cartons sealed, and reinforced with two steel straps.

Says Benjamin Bernstein, President, Quaker Export Packaging Co., Inc., Philadelphia, "In approximately thirty working days we applied over 1,250,000 straps. During the entire operation there was no major breakdown. This proves the excellence of the design and engineering of the machine, and the excellent service and installation."

This is unitizing on a big scale (and on a hurry-up basis . . . in little more than a week after the first call from Quaker Export, Signode had delivered the power strapping machines and set them up for operation).

Dependability—and experienced, helpful follow-through—are part of every item in the complete line of Signode hand and power tools for tensional steel strapping. For additional information, or a survey of your needs, write,

SIGNODE Steel Strapping Co.

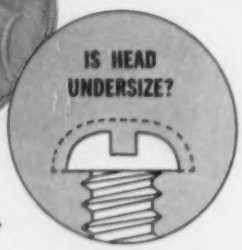
2623 N. Western Ave., Chicago 47, Ill.

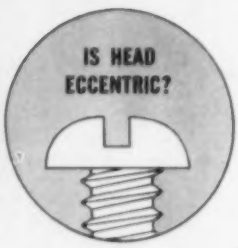
Offices coast to coast—Foreign subsidiaries and distributors world-wide.
In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto

P-K Standards protect you against the "*hidden reasons*"

Why planned savings fade out in assembly

... screws "headed for trouble"





... screws with "trouble bent" threads

... screws "pointed for trouble"

P-K Type A Sheet Metal Screws have sharp gimlet points. Start easy, drive straight, even when holes in two sheets are misaligned.

P-K Type Z Self-tapping Screws have well defined taper. Screw stands erect in hole and double lead thread means quick, easy starting; forms secure mating threads.

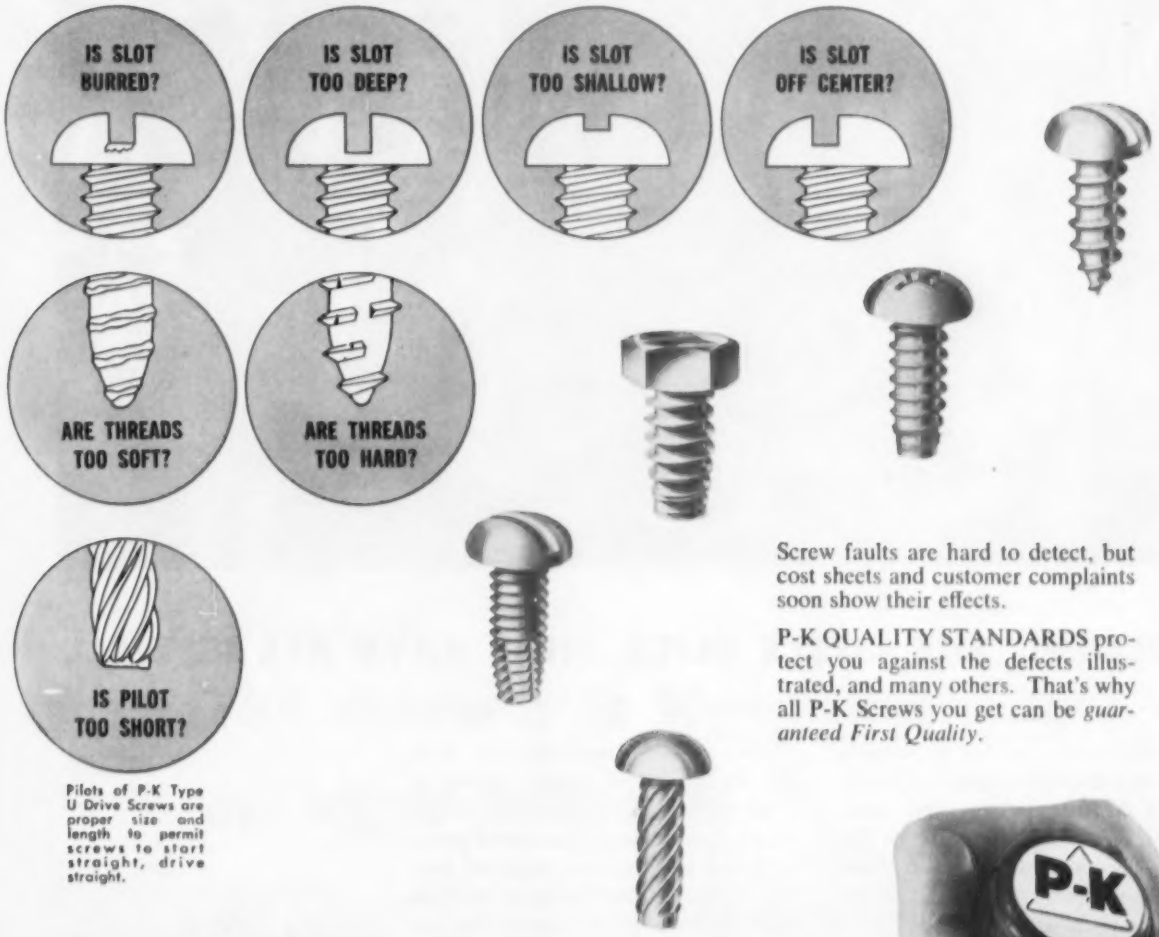
P-K Type F Screws have five thread cutting flutes; easier to start, less torque to drive, cut clean threads all the way in.

For screws that Start Right – Drive Right – Seat Right –

PARKER-KALON®

Only Parker-Kalon can offer P-K quality, the indispensable extra, along with the proved advantages of Self-tapping Screws. It takes P-K *quality standards* to guard against defective screws that cause assembly trouble, job slowdown, costly damage to parts, and hidden weakness.

Plan your assemblies for lowest cost. . . a P-K Assembly Engineer will help you. Then make sure *planned* savings *keep on paying off* . . . when you purchase, order "P-K". Parker-Kalon Division, General American Transportation Corporation, Clifton, New Jersey.



Pilots of P-K Type U Drive Screws are proper size and length to permit screws to start straight, drive straight.

Screw faults are hard to detect, but cost sheets and customer complaints soon show their effects.

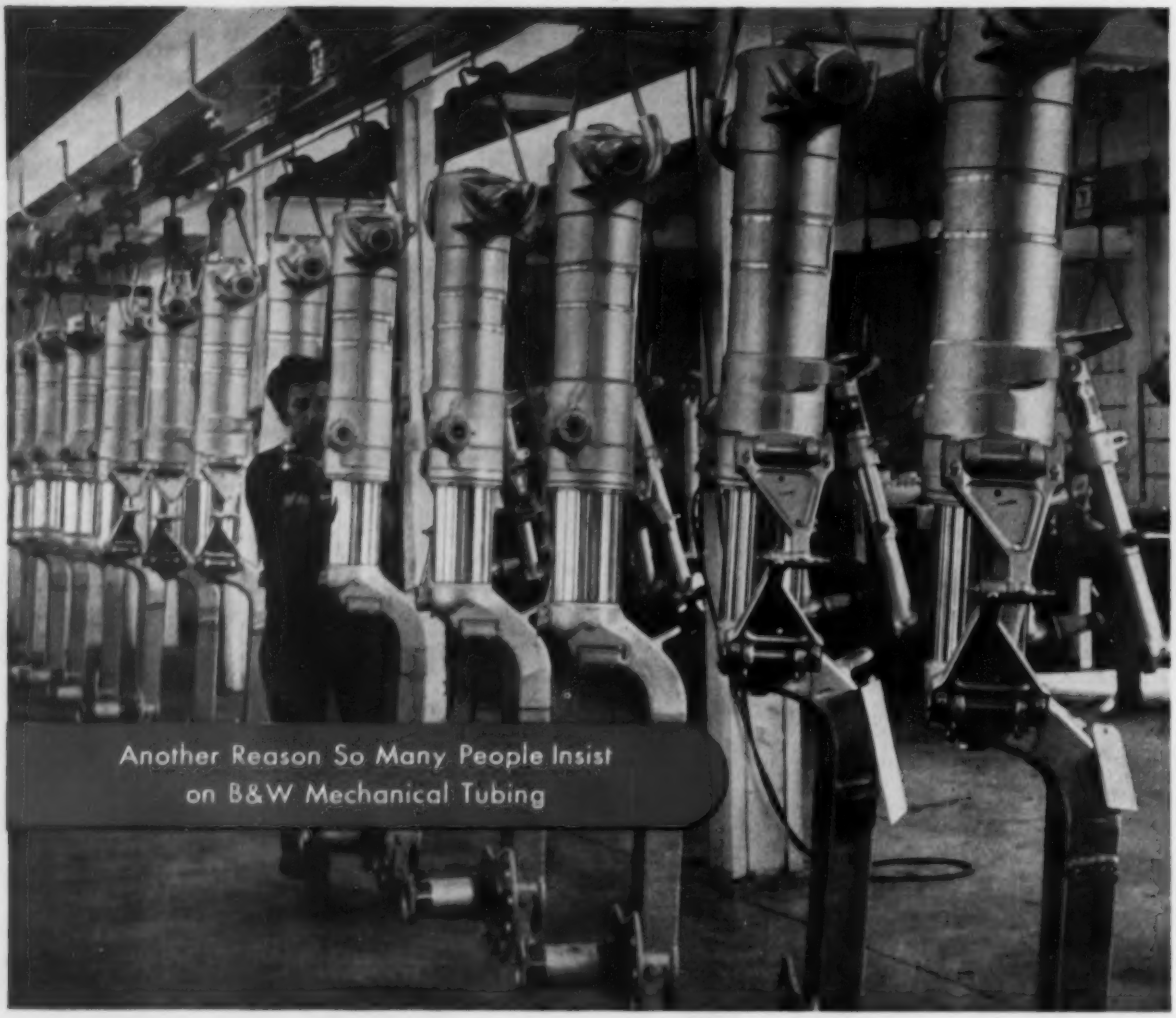
P-K QUALITY STANDARDS protect you against the defects illustrated, and many others. That's why all P-K Screws you get can be *guaranteed First Quality.*

Stay Tight — get

SELF-TAPPING SCREWS

IN STOCK . . . see your P-K Distributor

Remember **P-K** means **OK**



BUILDING THE LITTLE CLICK THAT SAYS ALL IS WELL

Every pilot who ever flew an airplane knows that the world's most reassuring sound is the little click that says "landing gear down *and locked.*" It's important because it means a safe landing. It insures coming in on your wheels instead of your belly.

Providing that reassurance is the job of Menasco Manufacturing Company, which specializes in the design and manufacture of landing gear components for the country's leading airframe manufacturers. Critical landing gear design and construction factors include weight conservation, space limitation, faster and more economical production methods, and the increasing takeoff and landing speeds of modern aircraft.

Since 1943 Menasco has been welding B&W aircraft quality tubing of 4340 steel to various kinds of forged shapes to produce the completed piston or cylinders. Menasco's improved pressure welding, called Uniweld, produces high-quality parts that cannot be produced in a single piece by conventional forging methods. The strength and quality of these Uniweld parts is equivalent to that obtained if it had been possible to produce them in a single forged piece.

For your own equivalent of "the little click that says all is well," insist on B&W Mechanical Tubing. Mr. Tubes, your link to B&W, has the whole story. *Or write for Bulletin TB-361.-1A.*

B&W
TUBULAR PRODUCTS DIVISION

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION
Beaver Falls, Pa. and Milwaukee, Wis.: Seamless Tubing, Welded Stainless Steel Tubing
Alliance, Ohio: Welded Carbon Steel Tubing
Milwaukee, Wis.: Seamless Welding Fittings

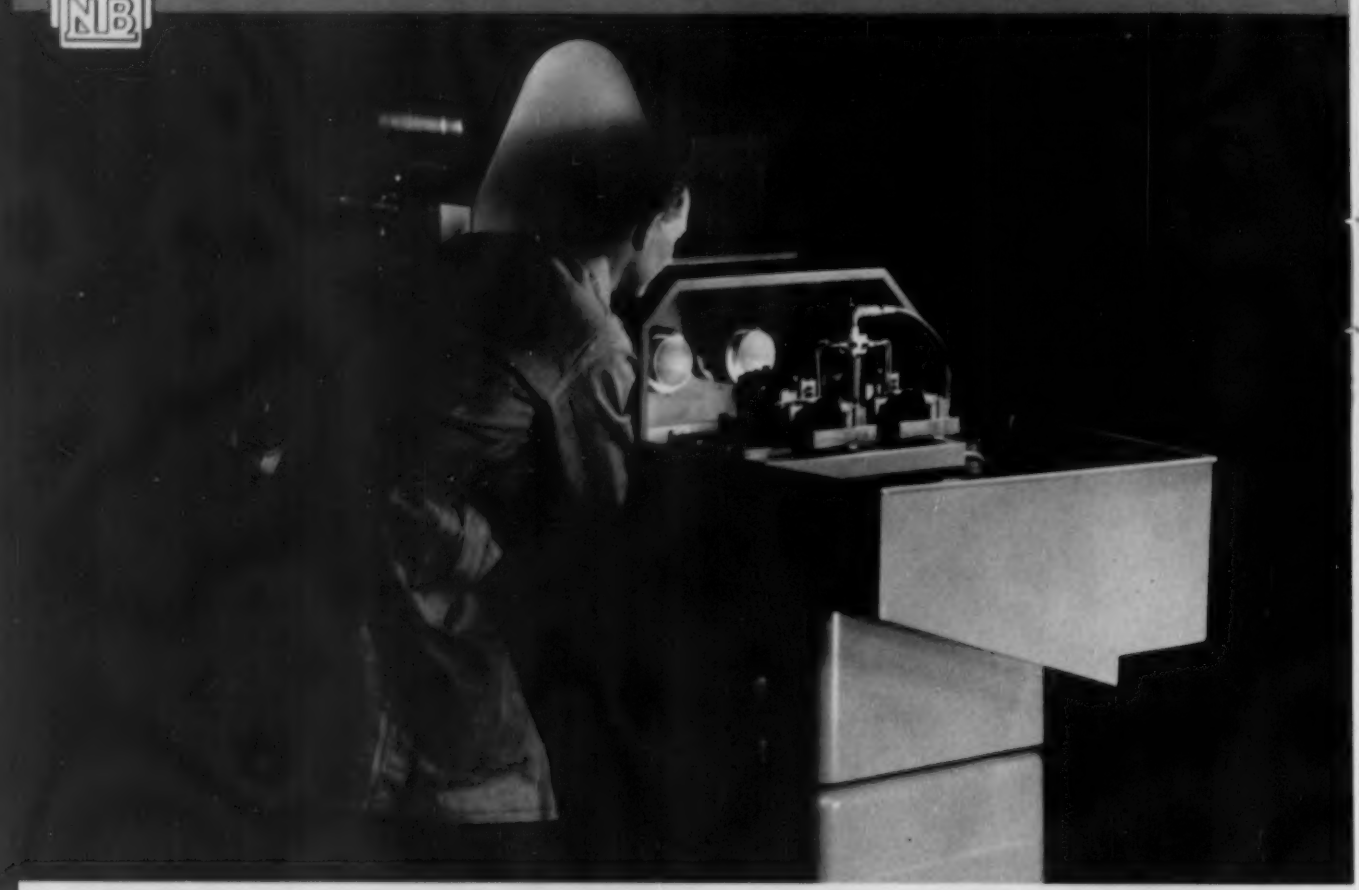
TA-5044(M)

Sales Up . . . Profits Down?

The Answer is New Methods on NEW BRITAIN

- AUTOMATIC CHUCKERS
- MULTIPLE SPINDLE BAR MACHINES
- SINGLE SPINDLE AUTOMATICS
- PRECISION BORING MACHINES
- LUCAS PRECISION HORIZONTALS
- NEW BRITAIN +GF+ COPY LATHES

See the following four pages for other New Britain New's.



The secret of precision boring is constant close control of the tool

Precision-ground cams assure accuracy of tool paths under all conditions on a New Britain Precision Boring Machine. Equally important is split-second control of cycle timing. This is accomplished by means of the program drum illustrated at the right. Cams and trip dogs accurately time all motions of the tool and the machine units. It is enclosed by a lift-off cover and is immediately accessible from the operator's side of the machine. These are important features of the New Britain approach to more profitable precision boring.

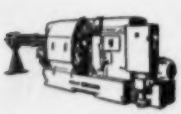
New Britain +GF+ Copying Lathe combines 2 operations in 1 pass

Yes, we taper turn the shaft end of this gear blank and copy turn the rest in the same operation — which keeps the cost of the piece down. This happens all the time on a New Britain **+GF+** copying lathe. You can spot other examples of it in the other pieces on the table.

The New Britain **+GF+** is a copy turning machine, not a lathe with an attachment. The copy slide is part of the carriage for taking heavy cuts at carbide speeds. Contoured work in small lots or on an automated basis, is accurately turned from a simple template on the front of the machine.

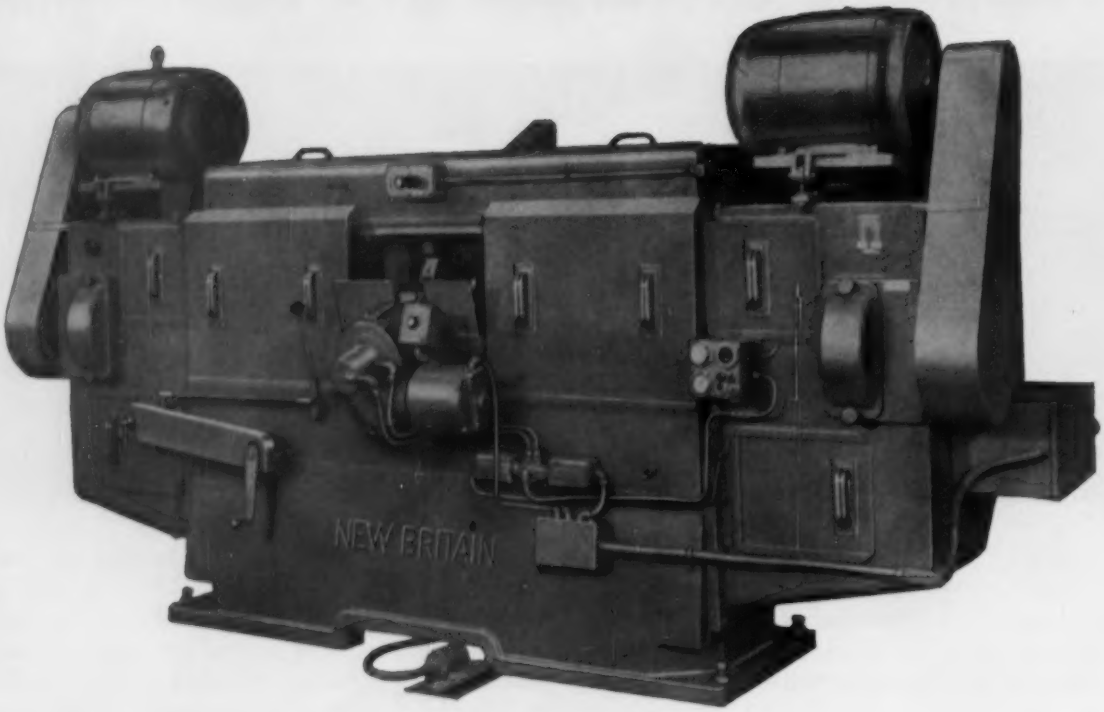
The secret of carbides on bar machines is elimination of slide deflection

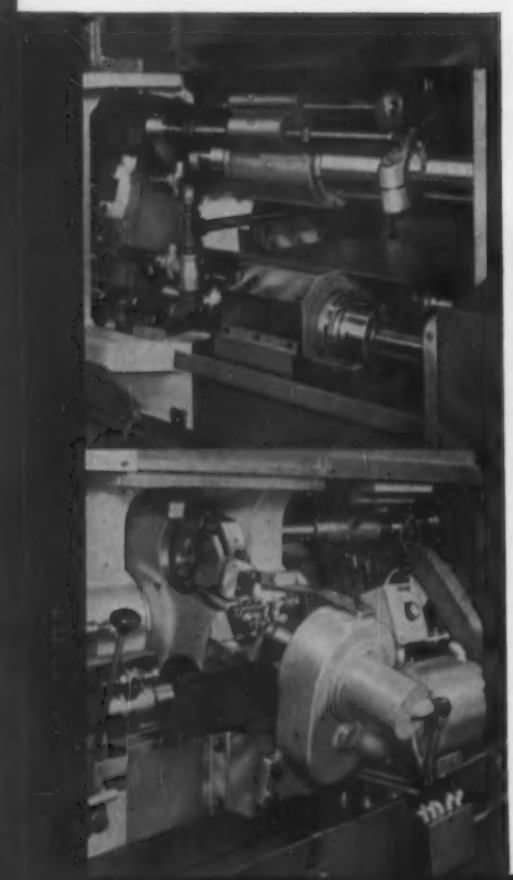
Carbides won't tolerate sloppy feeds. Positive slide actuation on a Model 601 New Britain Automatic results from mounting the cams directly behind the slides. A plus benefit is that cross slide feed changeovers can be made in minutes with these pick-off cams.



See the preceding two pages and the two following for other New Britain *New's*.

Six-spindle production in "Three-spindle" time





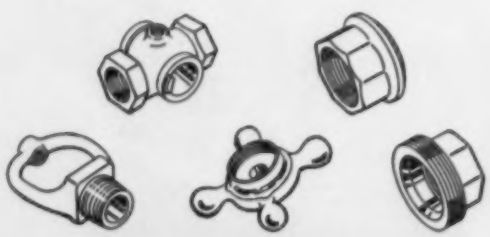
View of the rear side of the machine with the guards removed, showing the two lower spindles and the upper threading spindle.

All controls are within easy reach of the operator. Chucking is accomplished during the operational cycle by manual or semi-automatic means.

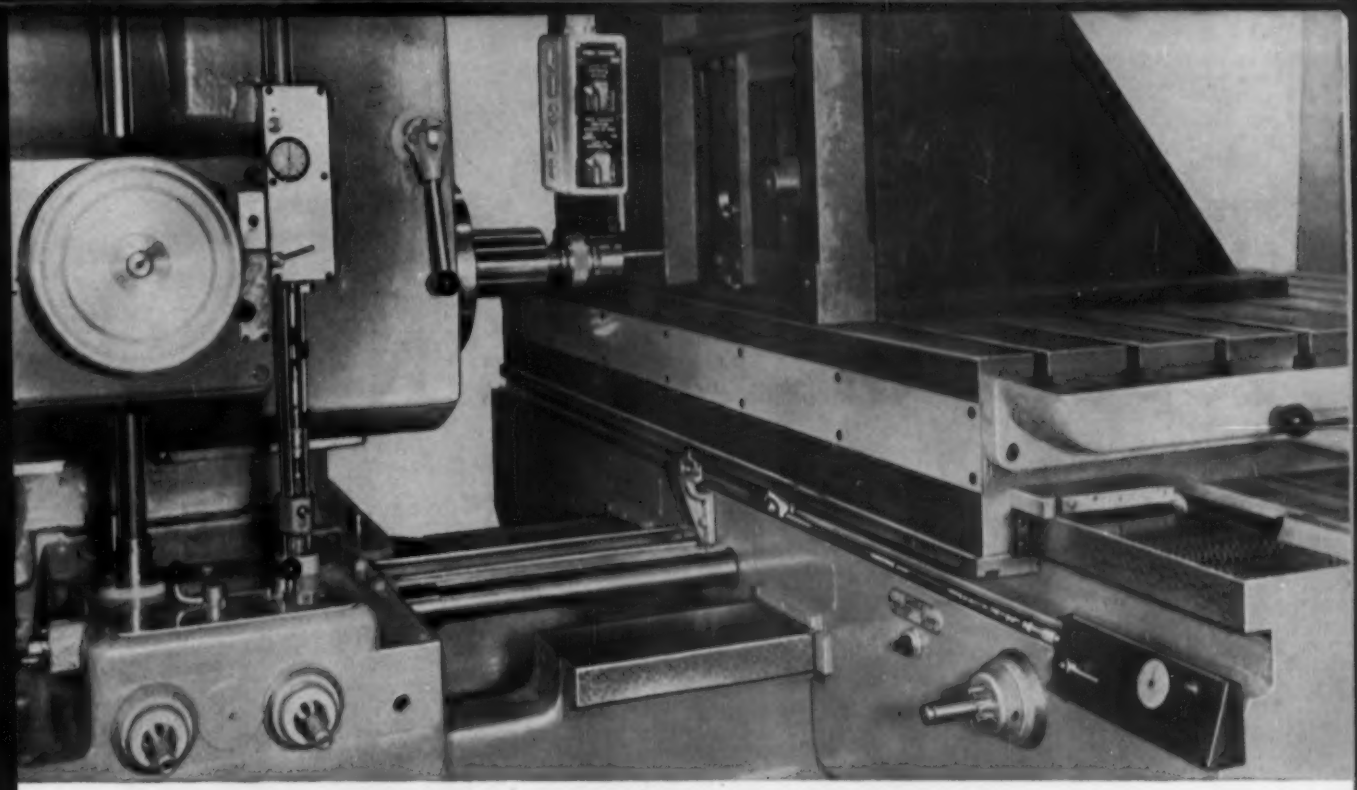
This new double-end New Britain Model 365 chucker is specifically for parts which can be machined simultaneously at both ends in one chucking, or two pieces per cycle.

It furnishes the *high spindle speeds* required for work on brass and aluminum, plus *beef* for machining and threading steel, plus *accuracy* guaranteed by a new turret locking mechanism. Idle time is minimized by power chucking and rapid traverse of all slides.

If your requirements include accurate volume production of double-end work, the Model 365 New Britain chucker can be a highly efficient money-maker for you. For more information, please ask for the catalog on Model 365.



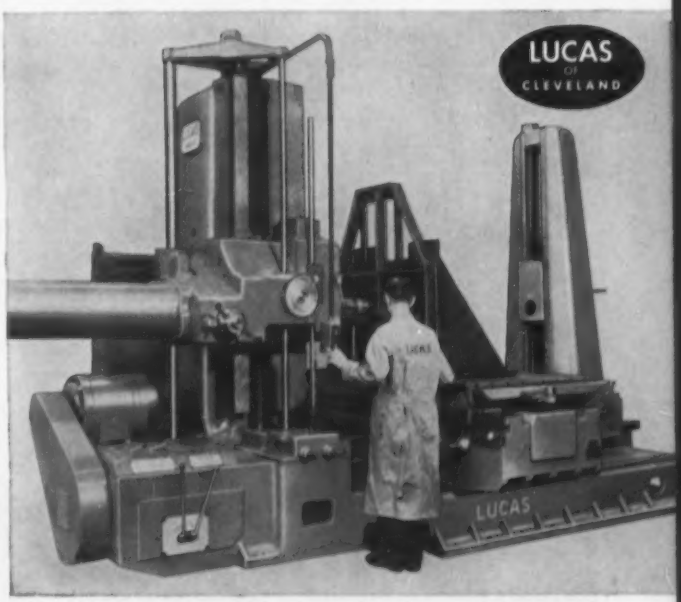
following for other New Britain *New's*.



Automatic Power Positioning is a money-maker on boring machine jobs

The entire operation of setting the head and table is done through power feeds at rapid traverse speed. The operator simply inserts the proper measuring rods and starts the positioning cycle. It takes an absolute minimum of time and reduces the chance of error in locating bore centers.

Lucas pioneered and specializes exclusively in building the horizontal boring machine. The full possibilities of this multi-purpose machine are enjoyed by Lucas owners, because of the many important Lucas features and improvements — including Automatic Power Positioning, new simplified pendant control and many more. May we send you the latest descriptive Lucas catalog. Address Lucas Machine Division, The New Britain Machine Company, 12302 Kirby Avenue, Cleveland 8, Ohio.



• AUTOMATIC BAR and CHUCKING MACHINES • PRECISION BORING MACHINES
• LUCAS HORIZONTAL BORING, DRILLING and MILLING MACHINES • NEW BRITAIN +GF+ COPYING LATHES

The NEW BRITAIN MACHINE COMPANY

New Britain-Gridley Machine Division, New Britain, Connecticut
Lucas Machine Division, Cleveland 8, Ohio

See the preceding four pages for other New Britain *New's*.

Two-year-old test driver reports on "Nylok" Nuts

"Ever watch a two-year-old like me in action? I'll give any piece of equipment a good shakedown and testing. Did it recently on my new Taylor-Tot. Figured it would be a cinch to shake it apart in nothing flat. But I'd never come up against 'Nylok' Nuts before. I gave it the full treatment—bumps, bounces, jars and jolts. The 'Nylok' Nuts held tight. Now I know why 'Nylok' Nuts mean positive locking."

The Frank F. Taylor Company had a young fellow like this in mind when it designed and engineered the Taylor-Tot. At several critical points Republic "Nylok" Nuts are used to assure positive locking even under severe shock, vibration and tension.

Republic "Nylok" Nuts lock whether seated or not. This means painted surfaces and soft metals are protected because "Nylok" Nuts do not have to be pulled up tight. Positive locking is assured in any position wherever you stop wrenching. Yet they can be backed off easily for maintenance or inspection of parts. And then can be re-used.

They go on easily, too, because either end is up. No special tools, lubricants or techniques are needed. Use them manually for piece-work. Or feed them automatically at full production speeds.

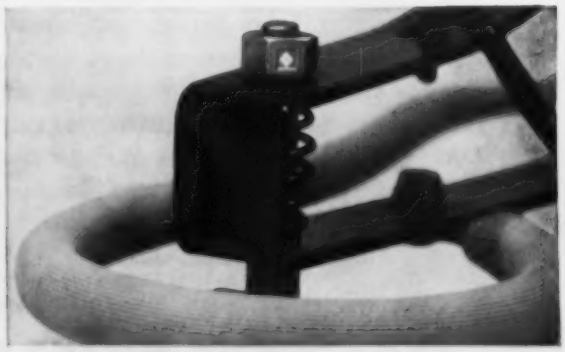
Think how Republic "Nylok" Nuts might be applied to your product or equipment. Why not make an actual test? Write us for a sample nut indicating size required. Available in Finished Series tapped ¼" thru 1", Finished Thick Series tapped ¼" thru ½", and Heavy Series tapped ¼" thru 1".

"Nylok" Nuts are but one of more than 28,000 regular types and sizes of high-quality fasteners made by Republic's Bolt and Nut Division.

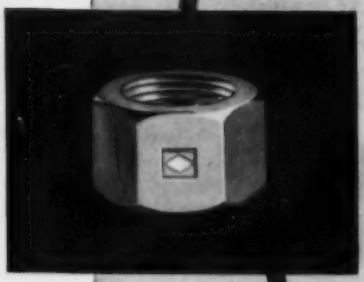
REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

Republic "Nylok" Nuts are used on rear wheels to assure positive locking and for ease of assembly. One-piece, cold-forged nut goes on fast from either end. There is no fumbling to find the right side. No special tools are needed for assembly.



Positive adjustment of spring compression on the Taylor-Tot's shock absorbers is accomplished with Republic "Nylok" Nuts. A nylon plug in one face forces the nut tight against the opposite threads of the stud as the nut is turned on.



MANY BUDDING YOUNG TEST DRIVERS take their first rides in bassinets made of Republic ENDURO Stainless Steel. Use of ENDURO in their construction gives these wheeled bassinets their attractive appearance. Provides adequate strength without excess weight. Makes them easy to clean and keep clean. Assures long life with minimum maintenance. It will pay you to find out more about ENDURO for your product. Mail the coupon.

REPUBLIC STEEL CORPORATION
3104 East 45th Street • Cleveland 27, Ohio

☐ Please send a sample "Nylok" Nut Size _____

☐ Please send more information on ENDURO® Stainless Steel

Name _____ *Title* _____

Company _____

Address _____

City _____ *Zone* ____ *State* ____

K-1054

WHY STEEL PRODUCTION COSTS GO DOWN WITH

1. **As the world's highest quality ramming mix for open hearth bottoms, Permanente 165 *lasts far longer* than other materials.**
2. **During this longer life, a Permanente 165 *Periclase* bottom requires *far fewer repairs*—thus drastically reduces down-time and repair material used!**
3. **As a result, you get more steel tonnage per month with Permanente 165—*and at lower bottom cost!***

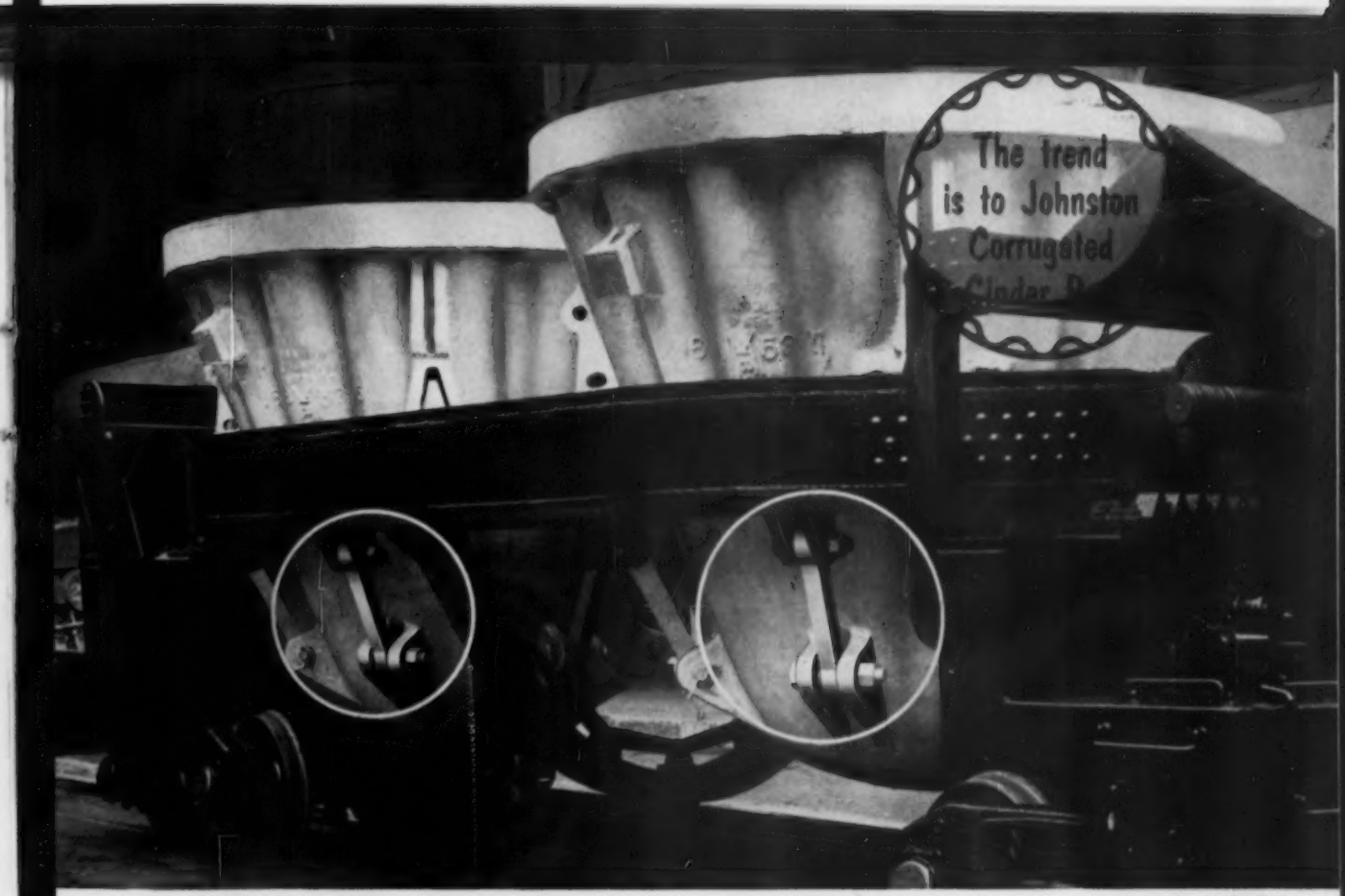
Let your Kaiser refractory engineer provide *you* with research, design and installation service to help you obtain more tonnage, improved quality—and lower operating costs!

Call or write Kaiser Chemicals Division, *Kaiser Aluminum & Chemical Sales, Inc. Regional Sales Offices: 1924 Broadway,* OAKLAND *12, California . . . 3 Gateway Center,* PITTSBURGH, *Pennsylvania . . . 518 Calumet Building, 5231 Hohman Avenue, Hammond, Indiana* (CHICAGO).

Kaiser Chemicals

Pioneers in Modern Basic Refractories

Refractory Brick and Ramming Materials • Dolomite
Aluminas • Magnesia • Magnesite • Periclase



CAR BY POLLOCK

Announcing...the Johnston Corrugated Cinder Pot

with NEW SHORT SUPPORTS

A new design development now makes the famous Johnston Corrugated Cinder Pot even longer-lasting than before. It is the brand new short support, already in use on Johnston pots in the plants of two leading steel producers.

The short supports are coupled to the pot at the same advantageous area as before: near the bottom, where the walls are coolest and strongest. However, instead of hooking over the top rim of the bail ring, the supports bolt into a set of lugs on its bottom surface (see photo). Thus, the pot walls have no opportunity to scrape or bang against the backs of the supports.

The Johnston pots with the new supports have all the other advantages that have led the steel industry to place more than 2000 of them in service. Advantages like curved sidewalls that resist cracking and inward creep ..expansible saw-cut rims that strengthen the pot top...corrugations that expand and contract freely and dissipate heat faster...optional copper bottom-coats that prevent "stickers".

Why not learn more about the reasons behind the strong trend to Johnston Cinder Pots? We will be glad to explain our policy of engineered slag-handling equipment and how it can be applied to your own slag disposal problem. Simply write to...

MACKINTOSH-HEMPHILL
DIVISION OF
E. W. BLISS COMPANY

MACKINTOSH-HEMPHILL DIVISION · PITTSBURGH · U.S.A.

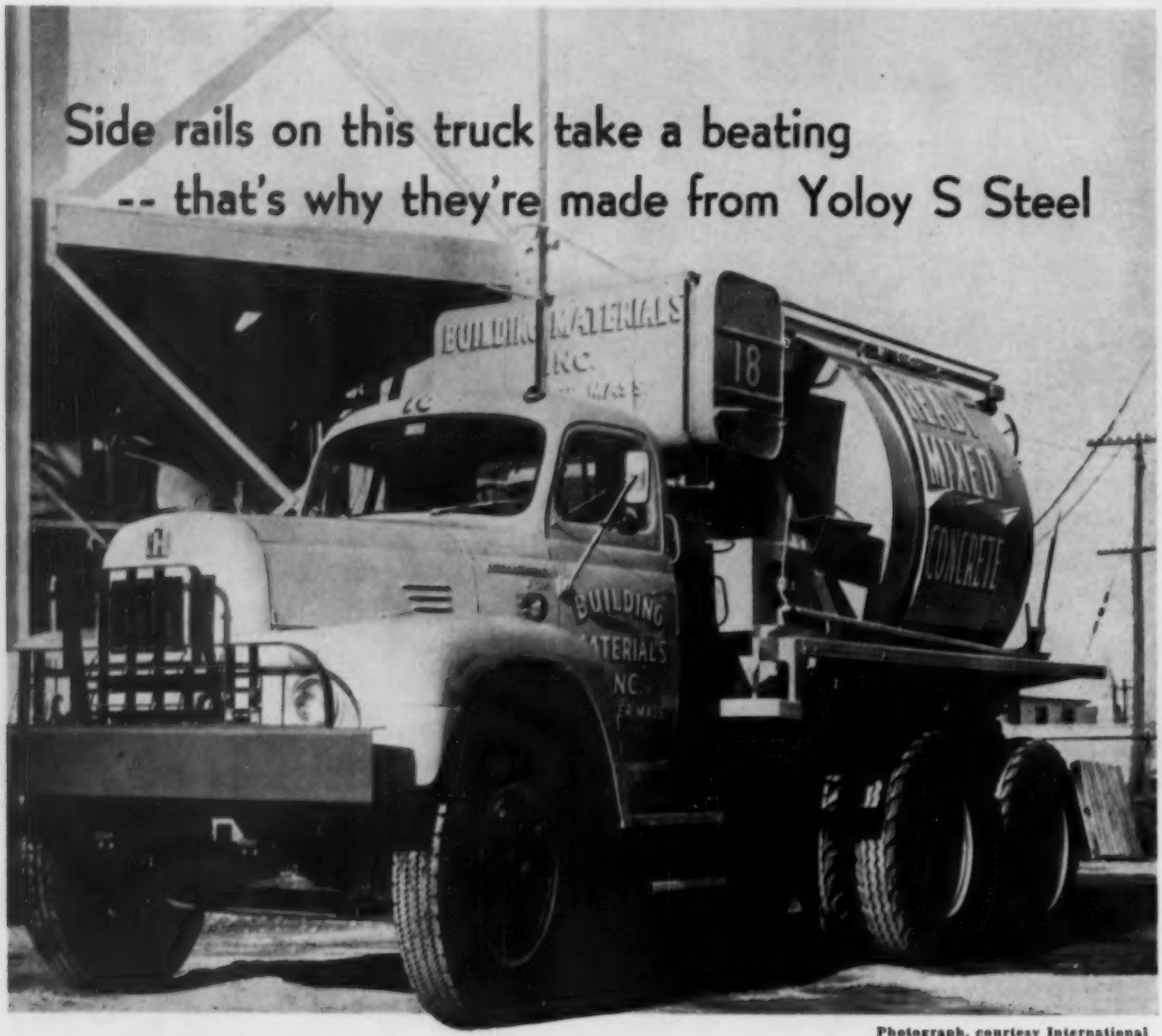
BLISS

Makers of the rolls with the Striped Red Wabblers

Pittsburgh and Midland, Pa.

cast mill rolls • Johnston cinder pots • rotary tube straighteners • Y-type cold mills
heavy-duty lathes • steel and special alloy castings • end-thrust bearings

Side rails on this truck take a beating -- that's why they're made from Yoloy S Steel



Photograph, courtesy International Harvester Company

Built for rugged hauling, on and off highways, this mixer truck has to have side rails that can take it—that's why they are made from Yoloy S Steel.* Yoloy S because its' a higher strength steel, 65,000 lbs. per sq. in. minimum yield strength, especially made where higher strength to weight ratios from normal construction is required for additional stamina. It has higher resistance to corrosion, abrasion, shock and vibration. The higher strength of Yoloy S permits valuable reduction in dead weight.

International Harvester, whose Model RF-230 is shown above, is just one of many prominent manufacturers who include Yoloy steels in their building specifications. If you have a problem, we would like to help you. Our District Sales Office near you is ready to supply information and service on the specific steels in the Yoloy Family that best meet your needs.

*Yoloy S frames fabricated by The Youngstown Steel Car Co., Niles, Ohio.

QUALITY YOUNGSTOWN SERVICE

Youngstown

Yoloy S (Nickel-Copper) Higher Strength Steel
Yoloy E (Nickel-Chrome-Copper) High Strength Low Alloy Steel

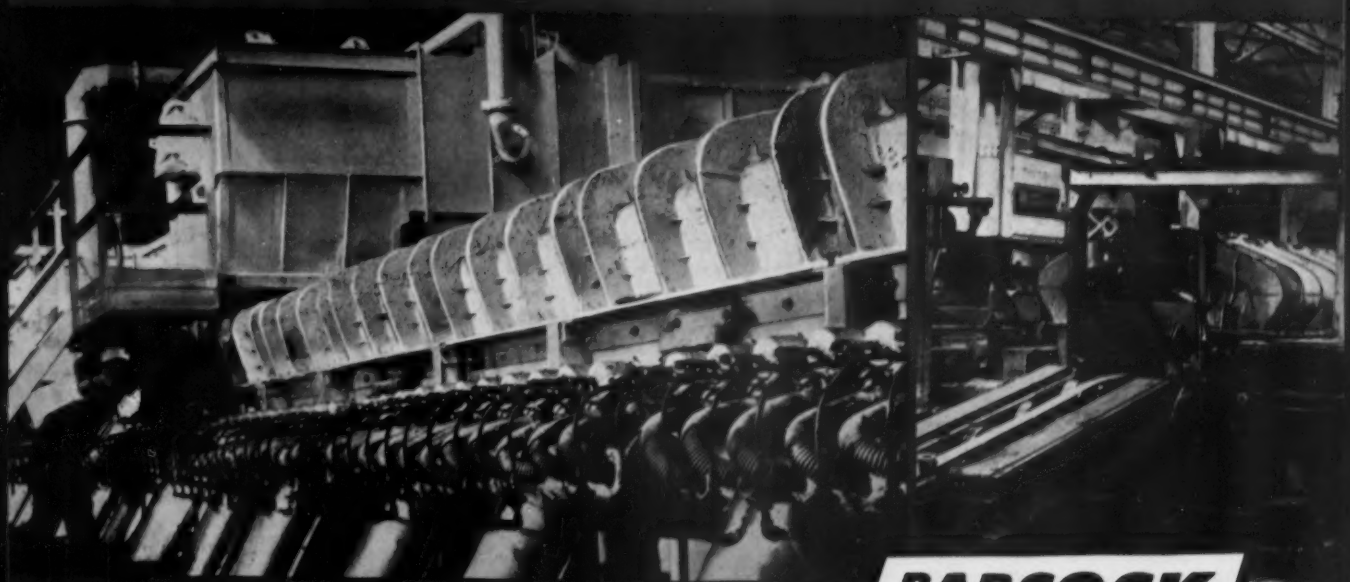
THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon, Alloy and Yoloy Steel
General Offices Youngstown, Ohio District Sales Offices in Principal Cities.

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - BLACK PLATE - RAILROAD TRACK SPIKES - MINE ROOF BOLTS

Stamina in Tough Service

B&W ALLMUL
...h
...ectrically
...used grain
for . . .

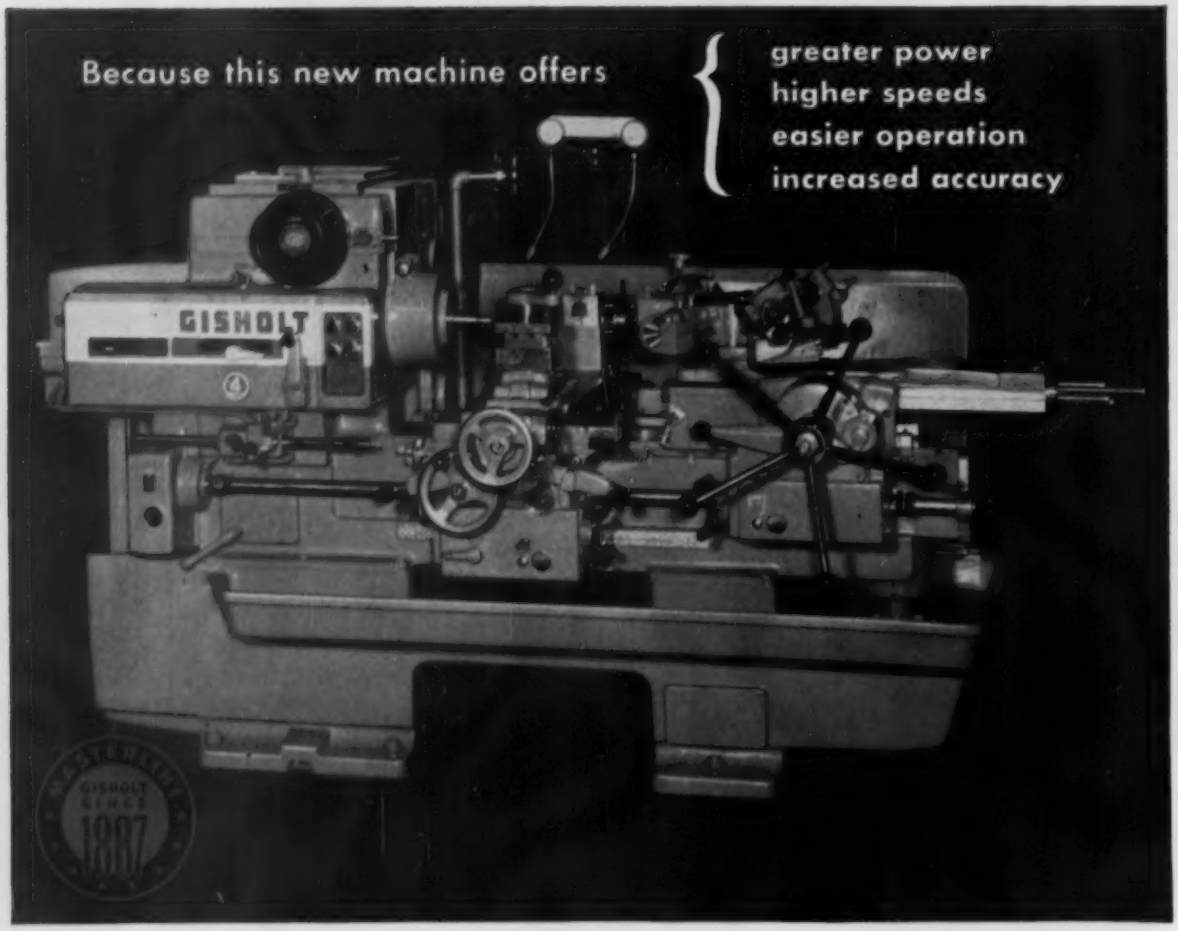
B&W



BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES 161 EAST 42nd ST. NEW YORK 17 N.Y.
WORKS: AUGUSTA, GA.

Let Gisholt help you find



You'll get more production from this new Gisholt Ram Type Turret Lathe

Typical of the great, new Gisholt MASTERLINE machine series, this Ram Type Turret Lathe gives you the advanced design features you *need* to help cut machining costs!

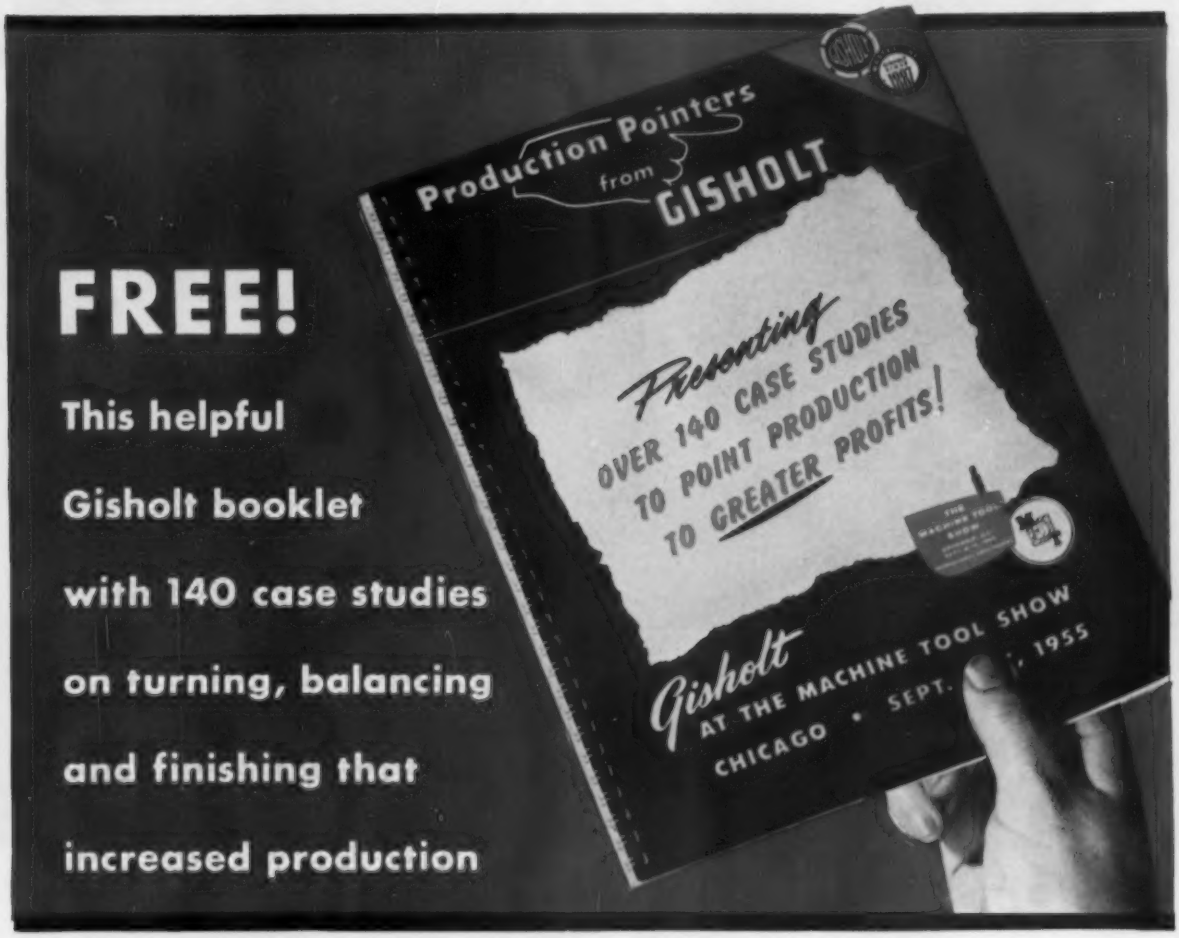
Here's more power (up to 30 h.p.!) and up to 16 speeds provided with a single-speed motor. And here's faster, easier selectivity; the new Hydraulic Speed Selector operates within a three-second cycle—direct or preset. A free spindle is available at all speed settings. Even on large speed change requirements, such as dropping from drilling to tapping, effort is kept at a minimum through the HI-LO Trip Lever which now offers a speed shift ratio of 8:1.

Add the Hydraulic Inching Control—Self-Adjusting Clutches—and a completely redesigned headstock; heavier bed casting, cross slide and ram; aprons with dial feed selectors—and you have some of the reasons why you will get more production, at *less* cost per unit, from the *new* Gisholt MASTERLINE Ram Type Turret Lathes!

Be sure to write Gisholt today for complete information about the new machines, or contact your Gisholt Representative.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

new short cuts to profits



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Here, you'll see both the methods and means of reducing setup and change-over time—simplified tooling—faster floor-to-floor operations that mean lower costs per unit produced. Through photos and drawings, you'll see setups that have solved some of the toughest problems—setups worked out by some of the nation's leading manufacturers to find better short cuts to profits—and to maintain (or frequently improve) quality of product.

By all means, take a minute of your time today to write for your big, illustrated Production Pointers Case Study booklet. Ask for Form No. 1180. Or, if you prefer, just contact your nearby Gisholt Representative.

THE GISHOLT ROUND TABLE *represents the collective experience of specialists in the machining, surface finishing and balancing of round and partly round parts. Your problems are welcomed here.*

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Madison 10, Wisconsin

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Madison 10, Wis.

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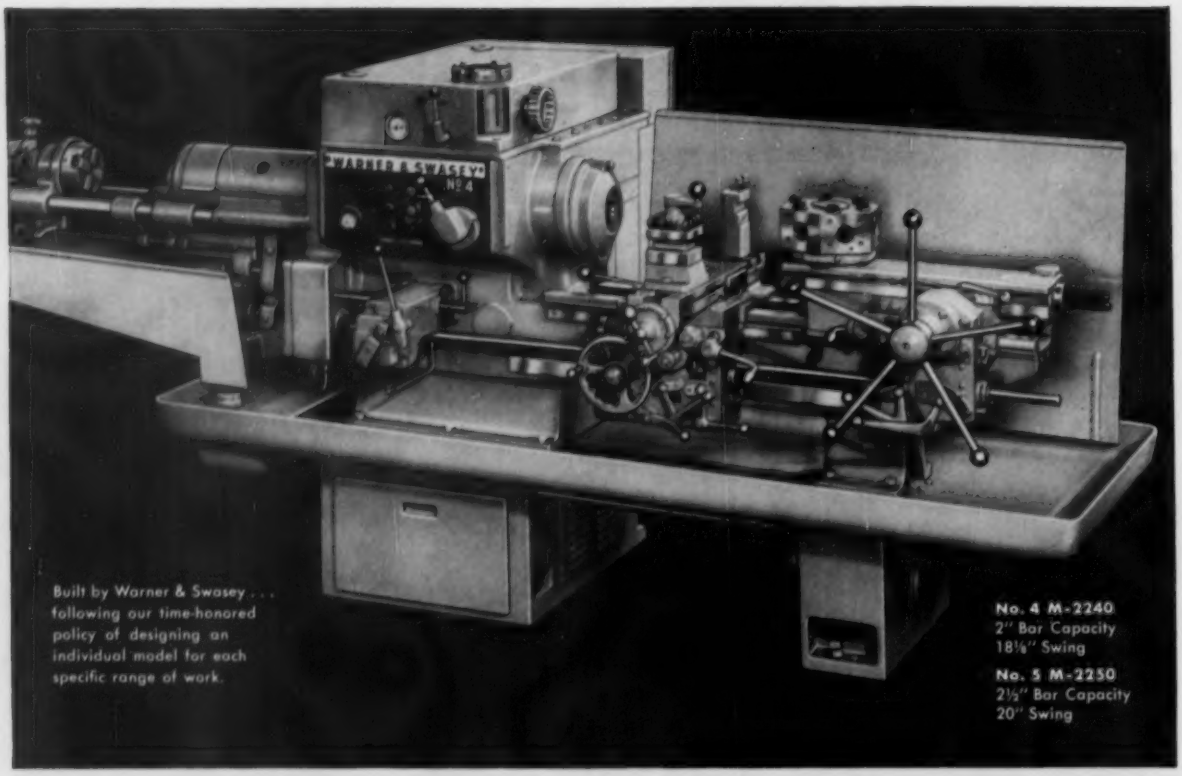
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- Smooth, quiet running, helical high-speed gears
- Short, stubby shafts—anti-friction bearings throughout
- Single lever control for forward, reverse, brake and free spindle
- One lever control for speed changes and 6:1 ratio high-low shift
- Two-speed motor provides 24 *unduplicated* speeds, forward and reverse, with a 62.5 to 1 over-all range
- Flange-mounted, direct-drive motors—no belts
- Patented direct-reading speed preselector—calibrated in rpm's, surface speed and work diameter
- Rigid, heavy-duty, high speed hydraulic bar feed with adjustable feed-out
- Single lever control for hydraulic collet chuck and bar feed
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YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS...WITH A WARNER & SWASEY

Meet the man with 1000 hands

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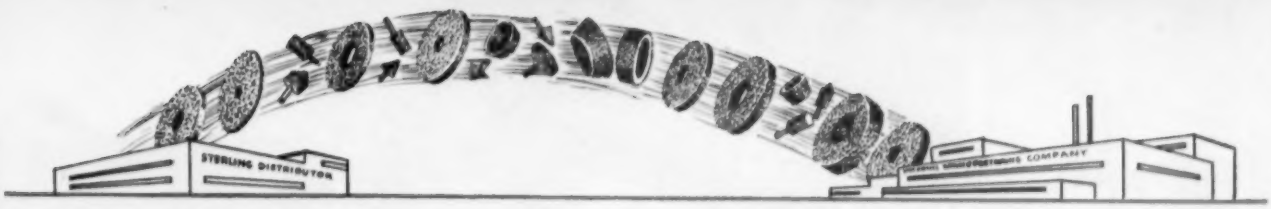

Every Sterling distributor has thousands of "helping hands" pulling merchandise from well-filled shelves every minute to provide day or night service for his customers. With his on-the-spot knowledge of his territory's needs, plus a plentiful stock to meet them, the Sterling distributor's "extra reach" provides fast delivery right now of the proper Sterling Grinding Wheel for your job—or any other important item you may need in a hurry.

The best distributor in your territory carries Sterling Grinding Wheels. Use the services he offers. Ask for the counsel of a resident Sterling abrasive engineer—just another of the "helping hands" at your nearby distributor's warehouse waiting to grab your difficult problem and solve it.

Write us. We will be glad to get you in touch with the Sterling distributor nearest you.

THE WHEELS OF INDUSTRY
STERLING ABRASIVES

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A SUBSIDIARY OF

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DISTRIBUTORS IN ALL PRINCIPAL CITIES

Gulf Products aid

Gulf Soluble Cutting Oil provides high cooling efficiency for this grinding operation on a propeller shaft.

A view of the material control area where the parts are stored in readiness for assembly after immersion in a tank of Gulf No-Rust FPR.

operations at Aerodex, Inc.

The world's most modern aircraft engine overhaul facility

By adapting mass production techniques to engine maintenance in the world's most modern engine overhaul shop at Miami, Fla., Aerodex, Inc. overhauls an engine with fewer man-hours than any other commercial organization. This represents a considerable saving to the Air Force, with whom Aerodex has large contracts, as well as to private concerns which send their engines in for overhaul.

Gulf products are used throughout the Aerodex shop to help speed their engine overhaul work. Gulf Lasupar Cutting Oil helps produce parts to extremely close tolerances with few tool changes in machining operations on many types of steel, while Gulf Soluble Cutting Oil provides high cooling efficiency for grinding operations. After machining, the parts are cleaned in a bath of Gulf Stoddard Solvent, then dipped in a tank of Gulf No-Rust FPR to protect polished metal surfaces against rust during temporary storage. Every engine is fueled and lubricated with Gulf Aviation Gasoline and Aviation Oil during the 3¾ hour test run after final assembly. And various other Gulf Quality Products help keep the auxiliary equipment required for a large operation of this type working smoothly and continuously.

You too will find, as did Aerodex, that there is a Gulf Product to fit your every need —quality oils and greases that can help you improve production and lower your maintenance costs.

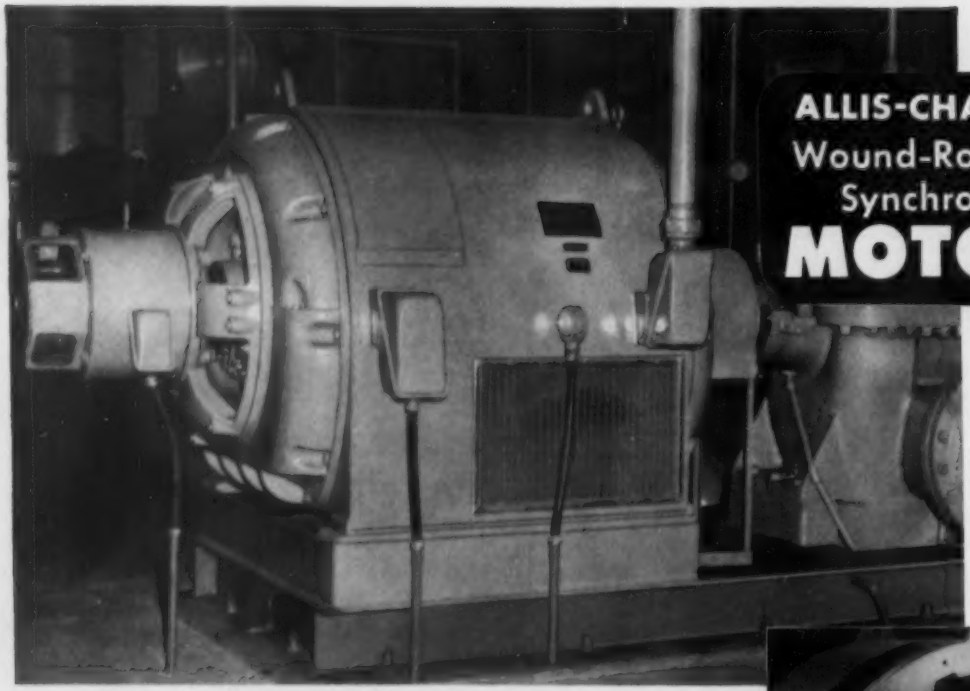
Consult the telephone directory for the number of your nearest Gulf office, then contact a Gulf Sales Engineer for help on any problem that involves a petroleum product.

THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

All engine parts are reworked, inspected and then sent to the material "hold" area, where they are immersed in Gulf No-Rust FPR. This quality rust preventive cleans the finely machined surfaces and protects them from rust during temporary storage.

GULF OIL CORPORATION
GULF REFINING COMPANY
1822 Gulf Building, Pittsburgh 30, Pa.

GULF



ALLIS-CHALMERS
Wound-Rotor and
Synchronous
MOTORS

Shown is a 400-hp, 900-rpm end-shield bearing synchronous motor. Other Allis-Chalmers motors of this design are available from 250 hp at 300 rpm and up, in drip-proof and splash-proof construction.

Now full protection without loss of accessibility

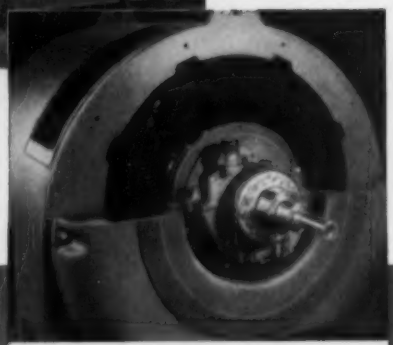
All parts, including slip rings and leads, are enclosed — yet removable inspection covers and end-shield sections simplify maintenance.

These motors combine modern functional design with maximum protection and accessibility.

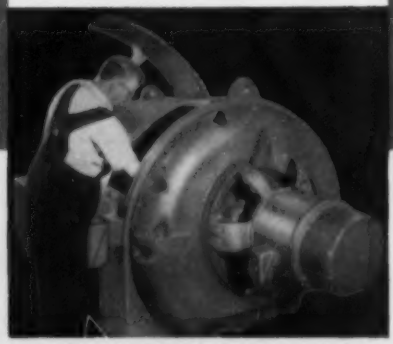
Here are some of the important features:

- Collectors and brushes are protected by box-type stator yoke from physical damage, dripping moisture, dust and dirt.
- Cast end shields provide rigid bearing support and full protection for motor windings.
- Slip-ring leads are brought out to a terminal box — they are not left exposed.
- Capsule-type sleeve bearings permit inspection or cleaning of motor windings without exposing interior of bearing to dirt.
- Access covers are secured by easy-operating, self-locking fasteners for ready removal.

Get details — Call your nearby A-C office, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin. Ask for Bulletin 05R8183.



Note accessibility offered by generous size opening covers. Upper half of end shield is removable for entrance to motor winding.



A-C ALLIS-CHALMERS

ALLIS-CHALMERS

A-4847

The Iron Age Newsfront

Big Expansion For Chevrolet

Chevrolet's latest expansion plans are an indication of how it expects to retain the number one sales position in the auto industry in 1956. This GM division will add 4,250,000 sq ft of manufacturing and warehouse space to its plants in 12 cities across the country in the very near future.

A Look At Soft Coal Reserves

At the present rate of consumption, bituminous coal reserves in the U. S. will last about 1900 years, assuming a 50 pct recovery rate. At the same recovery rate, and considering the annual growth in energy requirements, soft coal reserves could supply enough fuel for all thermal energy requirements for the next 331 years.

Metallurgists Delve Into Aging of Steel

Internal friction measurements are supplying metallurgists with fundamental information about aging of steel. This experimental procedure has already given a clearer understanding of strain aging by affording a simple method of measuring dislocation densities. This, in turn, can lead to new achievements in making steel with more desirable working qualities.

Ore Carriers Have Huge Job Ahead

Despite record high steel output this year in Great Lakes area, iron ore stocks are 4.3 million tons under the same time a year ago. Total consumption through September was 65.4 million tons compared to 49.4 million tons a year ago. At the present time, 190 of a total of 205 blast furnaces are in operation. Last year, there were only 128 in service. At this rate of consumption, ore carriers will probably extend the season as long as weather permits and hope for an early start next year.

X-ray Gage Measures Tin Plate In Process

Newly developed X-ray gages measure nondestructively the amount of tin applied to strip steel on three lines of a large mill. This is done during the plating operation. The equipment overcomes problems normally encountered with delicate instruments under mill conditions. It has a high degree of accuracy—within six ten-millionths of an inch—and gives a permanent record of the amount of tin applied to a tin coil.

Promise For More Colored Aluminum

Although not yet confirmed, there are straws in the wind that several GM divisions, including automobile and major appliance, will use colored aluminum decorative parts on 1957 models. If not '57, it's almost certain for '58.

Instrument Locates Ores From Air

Nothing's been said in the way of a public announcement yet, but it now looks likely that the first American company to make use of the airborne electromagnetometer will be Phelps Dodge. The instrument will locate copper deposits from the air.

Exchange Radiation Histories

Many firms using radioactive materials—and the number is growing rapidly—find it advantageous to keep on file the film badges of exposed workers. Only two deaths have resulted from radiation in the U. S. since the beginning of the Atomic Age, but claims for possible injuries have started to appear. Some large companies are now exchanging radiation histories when exchanging workers who have been exposed to radioactive materials.

TV and Radio Sales Stay High

No falloff is expected in TV or radio sales next year. At the current trend, TV sales should hit 7.5 million sets. The industry is anticipated to do as well next year—perhaps a little better. One large radio producer will bring out a transistorized car radio in '56.

Diamond in the rough

This 42,000 pound Finkl FX die nearing completion at the Ladish Co., Cudahy, Wisconsin, will be utilized by that firm in drop forging 1681 pound close tolerance aircraft propeller blades. FX is but one of many Finkl steels available for forging operations, all of which are quality controlled with "built-in" characteristics required for precision production. For the proper die steels to fit your needs, ask your local Finkl representative or write for the Finkl catalog.

When you next consider hot work tooling, die blocks, or forgings, call on Finkl for "impressions that last."

DIE BLOCKS
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NEWS SECTION SPECIAL REPORT

SMALL BUSINESS: Can You Act Big?

School group spends a day with New Jersey company . . . Find young concern applying bigtime approach to operations . . . Streamlined selling, concern for employees pay off—By G. J. McManus.

◆ HOW does a small company with sales of about $1 million a year keep from being swallowed up in these days of big business?

How can a stable payroll of 50 or 60 competent workers be maintained without losing good men to larger industry?

Answers to these questions, which small businessmen ask themselves every day, were learned in part last week by a group of New Jersey teachers. As a Chamber of Commerce activity, Camden County teachers heard how it's done at KSM Products, Inc., Merchantville.

First, they were briefed by company president Frank Kelemen. A husky man in his early forties, Mr. Kelemen told how he started the company nine years ago with two other men, borrowing money to buy equipment.

Basic Products

He spoke about products and prospects. KSM makes electric arc welding studs, stud welding equipment and related accessories. Bread and butter item is the stud. Welding guns, control units and generators are vital parts of the KSM stud welding system. The company sells a whole process.

Features cited for KSM stud welding include fast application, strong bonding and easy mobility. Stud has solid flux attached to one end. It is welded in an automatically controlled cycle.

Applications include boiler plates, rail cars, auto bumpers and armored tanks. Direct competition is Nelson Stud Welding Div. (Morton Gregory Corp.), Lorrain, Ohio.

KSM sales run about $1 million a year. Company employs between 50 to 60.

Teachers went from the briefing session to a plant tour. They saw engineering, production, sales and other departments. They heard of day-to-day problems, how they are solved successfully. And they learned some of the secrets of successful management.

In the early days of the company, when he was still deeply in hock and scrambling to stay above water, Frank Kelemen did an unusual thing. He sat down with consultants and drew up a full-scale organizational chart. Sales department; manufacturing department; engineering; office force—all the functions of a big concern with detailed breakdowns for each department.

With this plan before him, Mr. Kelemen began gathering men and building. He hired men as machine operators with the thought that they would become foremen as the company grew. He had his blueprint and he picked men who could move up naturally as the organization expanded.

And the company did move forward. In 1949, dollar volume was over $100,000. In 1952, it was close to $600,000. Now sales are hovering near the million mark.

Steady Employment

The posts of plant superintendent, production control superin-

TEACHERS LEARN from company president Frank Keleman how KSM Products, Inc., makes and markets electric arc welding studs. Taking part in educational program, teachers spend a day at the plant.

tendent, chief engineer, office manager and others have been filled in on the chart. There has been little deviation from the original plan and early starters have moved up as foreseen.

KSM is proud of its record of employee longevity. Only two people have left in the past year. Two points are cited in this connection. Employees are well treated. Every man is given a written statement of privileges, benefits, pay policies and regulations.

Pay policy calls for the area average to be the minimum at KSM. The company makes regular pay surveys, tries to keep ahead of any area increase. Idea is to avoid any appearance of being forced into giving more money.

Benefits include two profit sharing provisions: A yearly bonus and a trust fund. Twenty-five pct of operating profits goes into the annual bonus; 33 1/3 pct goes into the employee trust fund. (12 pct return on invested capital comes out first).

Trust Fund

After three years employment, a man can withdraw a certain portion of his trust share when he leaves the company. The amount goes up 10 pct each year until a man has 100 pct equity after 11 years. After 35 years an employee figures to have upwards of $20,000 waiting for him in the trust.

Speaking of the trust fund and its growth, Mr. Kelemen says: "I'm out to make capitalists of our employees." He has plotted the values of stocks in which employee trust funds are invested. He plans to post these graphs on the company bulletin board, hopes to get machine operators and janitors interested in the nation's financial workings.

All production work is on an hourly pay basis. The company feels there is ample incentive built into bonus, trust fund and other programs.

Solve Problems

Big KSM problem right now is production scheduling. The difficulty lies in the infinite number of stud dimensions that can be ordered. Standard stocks and long production runs are difficult to maintain.

KSM has stressed flexible service as the young company struggled to get started. As a close-knit, versatile group, it has been able to move fast in filling rush orders and setting up special runs. Feeling now is that the organization has grown to the point where more formal scheduling procedures must be adopted.

VISITING TEACHER operates stud welding gun as KSM research engineer Ken Ritter explains technique.

KSM sells directly to plants in heavily industrialized areas; uses distributors in the South, Canada and on the West Coast.

Sales people are called district engineers; are selected for selling experience and mechanical aptitude. The district man must be able to talk design and mechanics with engineers; do a certain amount of emergency servicing; instruct operators; and talk sales with purchasing agents and top management.

He is allowed considerable freedom in working his territory. He makes up his own schedule, doesn't get detailed instructions.

"We hire mature men," says sales manager Rex Taylor. "And we know what a man's expenses should average."

Pay Salary

Sales pay is salary plus commission. The salary is a minimum figure, no matter how much the man sells. There are no quotas; the one thing Mr. Taylor insists on is progress.

Sales effort is concentrated on steady sources of business. Public utilities, rail car builders and certain types of defense work are considered desirable for stable production and steady growth.

Orders that would call for the hiring and subsequent laying off of people are not pushed.

THREADING STUDS at KSM Products is a fast, flexible operation. Studs are hand-fed into cold rolled threading machine. Company feels variety of work rules out fully automatic feed at this time.

SUB: Industry Eyes Ohio Referendum

SUB principle tied in with big boost in jobless pay in one measure . . . Industry, labor, meet head on over the issue . . . Governor calls proposal fantastic . . . Both sides make claims—By T. M. Rohan.

◆ CIO'S NEXT big push to get the Supplementary Unemployment Benefits show on the road faces a major hurdle in Ohio in the November elections. And a good part of U. S. industry is watching the outcome.

The issue in Ohio is complicated by the fact that the SUB principle is tied in with a plan to raise unemployment benefits to a much higher level.

The SUB principle arises in that in most states an unemployed worker can not receive regular state unemployment compensation if he has another source of income. To make the Ford, GM and Chrysler agreements workable, favorable action is required in states where two-thirds of affected employees work.

Important State

Michigan is already cleared through an administrative ruling of the attorney general's office. So the heavily industrialized state of Ohio is the key hurdle. General Motors has over 82,000 employees there and spends more than $400 million annually. Ford has over 20,000 workers with further expansion in full swing. Chrysler's employment is only 2500, but a major increase is in sight with one of the nation's largest stamping plants due to start near Cleveland.

After unsuccessfully attempting to get a bill through the Ohio legislature, the CIO went to the electorate with an initiative petition. Signatures were obtained and the issue was placed on the November ballot.

But voters will be unable to vote on increased state unemployment benefits independent of the SUB principle, or vice versa. Therefore, the issue is clouded, but at the same time attracts the full force of organized labor and industry to campaign for and against the proposal.

If approved, the proposal will raise maximum unemployment from $33 per week for 26 weeks to $59 for 39 weeks.

With probably over half the auto industry's employees in Michigan, a win in Ohio will give the necessary two-thirds and the plan can be applied nationally to all workers covered. If the petition fails in Ohio, Indiana is the next target. If that doesn't work, it will take a combination of any two of New York, Illinois, Missouri, California or New Jersey.

Industry in Ohio is presenting a solid front against the proposal. Democratic Governor Frank J. Lausche calls the proposal "fantastic."

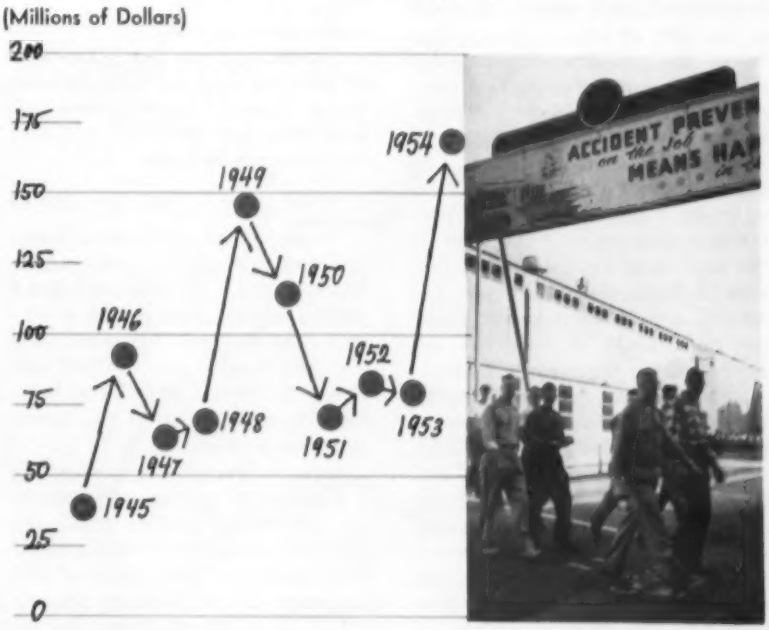
Major automotive suppliers, some steel producers who will face the SUB next year, and other heavy industries have made 23 trained company officials available in Cleveland alone for talks.

Industry maintains that present payments are adequate. It also contends it would cost Ohio employers about $47.5 million annually or $21 per employee; encourage a "handout for voluntary idleness"; drain the present $600 million in the state Unemployment Reserve Fund; and set a precedent for overriding the legislature.

It makes a point that the state is being used as a guinea pig to establish double benefit patterns.

The union's major argument is that the $47.5 million figure is predicated on a relatively low employment year, 1954, that the figures would be about $11 per employee or 0.5¢ per hour.

U. S. Unemployment Payments



MARKETING

APPLIANCES: Sales Graphs Climbing

Big appliance makers hit new sales highs . . . They're looking for 10 to 20 pct better business in '56 . . . New models annually, plus new set of trade-in rules highlight sales strategy—By *D. G. Picinich.*

◆ GOING INTO the last lap of what could be their best sales year, the nation's appliance makers are already talking about an even better year in '56. They foresee a possible 10-20 pct gain over '55.

The industry is counting on new models and a carefully worked out "dynamic obsolescence" program to hold tomorrow's warehouse and dealer inventories to a minimum, to furnish the enterprising merchant with a vast, up-to-the-minute replacement market in everything from automatic washers to color TV sets.

The long-range view is even rosier, according to one industry spokesman. He observes that within the foreseeable future 60 pct of all American homes will be air-conditioned and 10 million families will have two refrigerators.

Show Annual Rise

In addition to annual sales increases of 1 million units each of refrigerators and automatic washers in the next 10 years, it's also estimated the industry should double its sales volume of electric dryers, more than quadruple sales of dishwashers and food waste disposers.

With new housing starts expected to hit a solid 1.3 million units by year's end, coupled with the mounting trend of highlighting the kitchen as an important living area of the home, major appliance makers are battling keenly today for their share of consumer expenditures in tomorrow's market.

Sales strategy includes bringing out new and improved models of household equipment every year, inaugurating a new method of setting trade-in values on used appliances, based on points for age and condition, which the consumer can follow step by step. This, it's expected, will create customer confidence in the trade-in method of appliance purchases.

APPLIANCES are moving off production lines and being bought at a record rate. And the industry looks for even bigger sales in 1956.

Significantly, the first six months of this year have set industry sales trends expected to carry over well into 1956 and probably the next several years to come.

Cite New Highs

Norge, for example, reports record first half sales for this year at $62.9 million, compared with $31.8 million in the same period a year ago. The prospect for surpassing this year's sales goal of $120 million is "extremely good." Next year, the firm hopes to better this figure by at least 10 pct.

General Electric Co. is spending a record $165 million on research and production facility expansion this year. This will bring the firm's investment in new plants and equipment in the 10 years through 1956 to $1.2 billion—double the investment made between the company's incorporation in 1892 and the end of World War II.

Among new products coming out of GE labs are The Weathertron—a heat pump that will both heat and cool the home electrically. It's already been sold in small quantities and the firm plans to install about 750,000 units by 1965.

Major appliance sales this year are expected to top 15 million units. Home laundry equipment will better last year's sales by 1 million units. Industry estimates on dryer production have been revised upward to nearly 1.3 million units. This will be the first year dryer output has topped the 1 million unit mark.

Motorola, Inc., a major TV and radio set producer, expects the industry to hit a record high $10 billion in sales by year's end.

PRODUCTION

TINPLATE: Making It Two Straight

Shipments during first three quarters indicate 1955 sure to hit new high . . . Previous record set in 1954 despite 20 pct drop in overall steel production—By W. G. Brookfield.

◆ SETTING a sales record in 1955 isn't unusual. But by doing so the tinplate producers are in a class almost by themselves. For this is the second record breaking year in a row. There weren't many fields which could boast of increased business last year.

While overall steel production in 1954 was dropping 20 pct, tinplate shipments hit a new high of 5,660,366 tons. And on the basis of the tinplate shipped during the first three-quarters of 1955 the new record will be somewhere around 5.8 million tons.

The big demand this year was in the second quarter when shipments were at the rate of 8 million tons per year.

Shipments are off seasonally in fourth quarter. But tinplate producers are using this slack period to build up mill inventories that are now close to rock bottom. This is essential to preventing the tinplate market from becoming too tight in 1956. Heavy demand is expected to continue through all of 1956. Heavy orders have been placed for delivery during the first six months of next year.

The steel industry is in the process of building new facilities to handle an expected increase in tinplate demand in the next few years. A new electrolytic line was completed this year by U. S. Steel. Weirton Works of National Steel Corp. will start a new line in 1956. Before the end of 1957 Youngstown Sheet & Tube plans to have one and Bethlehem Steel two new electrolytic lines in operation.

Tinplate producers view prospects for the slightly more distant future with optimism. Not the least of their reasons is the recent report from the U. S. Census Bureau on the estimated population increase in the U. S. for the next 20 years. There are four estimates ranging from speculative to conservative. The minimum population increase expected by 1975 is 42 million. Per capita consumption of tinplate is 104 lb.

Producers experience in 1954 is a good illustration of the fact that they are not basically affected by an economic slump. Because of the economy of canned foods, more are consumed during periods of recession, thereby increasing tinplate demand.

And because the canning industry has gradually expanded to all parts of the country a regional crop failure will not significantly affect the canning industry's demand for tinplate. The crisis is restricted to only the immediate section while the slack is easily taken up by areas where crops are good.

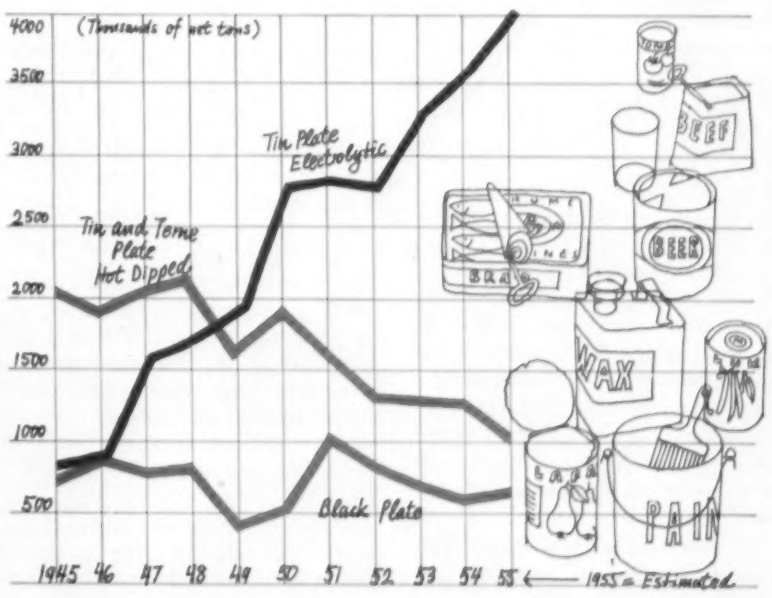
Export demand continues strong. Great Britain accounts for the biggest share of the increase, but gains are evident in all parts of the world.

Several of the newer markets show evidence of gaining momentum and the prospect is bright for a better-than-normal increase in demand from the beverage industry and the frozen food industry.

The reason the beverage industry is counted on to become stronger is based on the trend among soft drink bottlers to switch from bottles to cans.

Whereas tinplate producers count on canned food selling during a recession they also count on the frozen food industry for additional revenue during good times. The demand from this source for tinplate has paralleled the growth in consumer acceptance and informed observers claim the end is not yet in sight for many years.

Tin Mill Shipments



TRANSPORTATION

LOCOMOTIVES: An Up Grade Into 1956

Locomotive building revives on strength of increased railroad business . . . Actual shortage of rolling stock prompts new orders . . . Boom is not permanent . . . Roads nearly dieselized—By *K. W. Bennett.*

SNUB-SNOUT "Train Master" packs a 2400 HP pull, is reportedly the most powerful unit on the rails today. Current order spurt for new locomotives will fill in rolling stock shortage, complete railroads' dieselization.

◆ CASEY JONES would have smiled with pride. With orders still coming in strongly, U. S. locomotive builders have tied down the throttle, will build new locomotives at capacity output into first quarter of next year.

At mid-October, one builder reports the locomotive building industry is credited with $146.5 million in new orders thus far this year. The figure is a 102 pct increase over the $72 million booked for the same period in 1954. Locomotive installations by the railroads in 1954 slumped to 1,113 units from a high of 3,514 units in 1951. About 940 have been sold this year and the figure is expected to hit over 1300 by year's end.

The current pickup didn't get underway strongly until March of this year. Deliveries ran 100 per month through the first three months of 1955. Railroads, after watching carloadings climb through December, January, and February of this year, finally started to roll. By that time new rolling stock was more than a sound economic investment. It was a necessity.

Level Out

Few will call the present availability of railroad rolling stock a locomotive shortage, but it's a fact that in the past 60 days at least two large roads have recalled veteran locomotives of the steam era from sidetrack retirement and pressed them into service.

Backlogs for all out locomotive production extend as far as next May and, as of last week, incoming orders from railroads were still gaining steam. Builders, large and small, expect the spurt to recede in the near future. One producer, currently having his best period in the past three years, indicates that he expects to level out at about a 30 pct advance over last year's business. But any slowdown in incoming orders will not affect production until well into next year, probably as late as second quarter.

Electro-Motive Div. of General Motors, Alco (formerly American Locomotive), Fairbanks-Morse, and Baldwin-Lima-Hamilton are leading in about that order as of October. But new business for these leaders indicates strong activity for smaller producers, as well as producers of the "extras" purchased as components by locomotive builders. Steam generating equipment, for instance, is purchased from firms like Vapor Heating or Combustion Engineering; electrical equipment may come from General Electric, General Railways Signal, or a host of similar firms.

All Diesels

Is the current upswing spelling a rebirth of dieselization? Not quite, say railroaders. Railroads retired 50,936 locomotives between 1932 and 1954. They have put into service 26,616 locomotives, nearly all diesel. Of 8530 steam locomotives remaining at the end of 1954, 7000 are operable. N. C. Dezendorf, general manager of Electro-Motive, believes that 5000 more diesels will mark the finale of dieselization.

The boom in railroad traffic this year encouraged roads to step up the final stages of the switch from steam to diesel power. And boom it is. One road has advanced coal

loadings, its major freight item, 39 pct over the January to October period of last year.

Another factor behind bulging locomotive backlogs: locomotive builders have been gearing down production since 1953. Diversification and reduced operations in locomotive divisions have drained off manpower. The sharp boost in railroad buying of locomotives caught builders with fewer building facilities than the peak years of 1950-52.

How Long?

A third factor: steel is tight and getting tighter. Carbuilders are in worse shape, but the locomotive buyers are suffering steel delivery pangs.

How long will the high locomotive building activity continue? At least through first quarter 1956, veteran salesmen forecast. Mr. Dezendorf indicated earlier this year that remanufacture and upgrading of diesels might spell out an additional 1700 building jobs per year in the years to come, and that depreciation might call for rebuilding of another 3400 per year. Not all railroaders will agree that the replacement market looks that good.

Sell Titanium Bolts

More than $650,000 worth of titanium bolts have just been ordered from Standard Pressed Steel Co., Jenkintown, Pa.

Bolts will go to Convair Div., General Dynamics Corp., Fort Worth, Tex. They will be used in a new plane. Deliveries start this month.

Use Limited

To date, the lightweight titanium has been used only sparingly in aircraft. The government recently suspended its program to support expansion of titanium sponge capacity, explaining that the nation's limited production was still in excess of military and industrial uses.

SPS says problems of fatigue performance or resistance to dynamic loading have been licked in the titanium bolts. Endurance strengths of from 50,000 to 60,000 psi are claimed for the bolts.

BUSINESS

ECONOMY: The Boom Continues

Farm income only gloomy spot . . . Otherwise, business is sound in all aspects . . . National income hit record high point this summer . . . Commercial building offsets decline.

◆ THE NATION'S economy, galloping along at record speeds, has turned the corner from summer to fall with only one major hurdle yet to take—farm income.

Highlights from the latest Government check show:

Industrial production in September reached the highest point in the nation's history, 141 pct of the 1947-49 average.

Bank loans to business increased in September by about $600 million, more than double the increase in the corresponding period last year.

Nonresidential building contracts climbed enough in September to offset a dip in residential contracts.

Employment expanded even further — nonfarm employment was up; factory employment remained about steady with August; the workweek rose to 41 hours; average pay at factories hit a new high of $78, about 8 pct above a year ago, and unemployment dipped to 2.1 million.

National income jumped to a record annual rate of $321 billion in April, May, and June. Personal income in August was estimated at an annual rate of $305 billion.

Working capital of corporations hit a record total of $100.6 billion on June 30.

The only real sore spot in the economy is farm income. While all other income was rising, from 1951 to January, 1953, the farm parity ratio of farm products dropped 19 percentage points. It is down another 9 points since 1953, while farm debt has risen $2 billion to hit $18 billion. Unless there is an abrupt change, farm income this year will hit its lowest point since World War II.

Manufacturing corporations, riding the crest of the economic boom, racked up all-time high sales and profits in the second quarter of this year—sales hit $70 billion, and profits after taxes reached $3.9 billion. Here are first-half figures on sales and profits for selected industries:

INDUSTRY GROUP	SALES Half Year 1954	SALES Half Year 1955	SALES Percent Change	PROFITS AFTER TAXES Half Year 1954	PROFITS AFTER TAXES Half Year 1955	PROFITS AFTER TAXES Percent Change
	(Millions of Dollars)			(Millions of Dollars)		
Primary non-ferrous metals	$ 3,388	$ 4,104	+21	$ 220	$ 341	+55
Primary iron and steel	7,077	8,669	+22	352	607	+72
Fabricated metal	6,117	6,686	+ 9	200	243	+22
Machinery (excl. elec.)	10,202	10,332	+ 1	482	522	+ 8
Electrical machinery	7,522	7,598	+ 1	335	340	+ 1
Transportation equipment (excl. auto)	5,508	5,725	+ 4	200	217	+ 8
Motor vehicles and parts	11,386	14,537	+28	631	1,079	+71
Instruments, etc.	1,855	1,708	− 8	92	96	+ 4
Miscellaneous	2,129	2,203	+ 3	49	54	+10
All manufacturing	123,472	135,602	+10	5,517	7,216	+31

MANAGEMENT

RELIGION: God and Work Go Together

Congress at Albany proves that religion and work are inseparable . . . More to work than material reward . . . Delegates included leaders in labor, industry, education and government service—*By Tom Campbell.*

◆ RELIGION and work go together. Separate them and you're in trouble.

This was the theme and conclusion of business and religious leaders at a meeting in Albany, N. Y., sponsored by the Episcopal Diocese of Albany. Further, delegates to the unique church congress came away from the meeting refreshed and fired with the zeal to (1) live what they preach, and (2) encourage others to do likewise.

Among the 250 industry, labor, and government service delegates were Benjamin F. Fairless, president, American Iron & Steel Institute; Dr. Arnold J. Toynbee, noted historian, and Hiland G. Batcheller, chairman, Allegheny Ludlum Steel Corp.

Mr. Batcheller was one of the prime movers behind the congress. But Suffragan Bishop David E. Richards of Albany was the sparkplug who organized and brought the meeting to a successful conclusion.

Promising Outlook

Dr. Toynbee indicated that time after time in history, work begun as a religious and Godlike endeavor wound up as a materialistic pursuit which robbed the people of needed spiritual help as well as sustenance.

Significant in the discussion was the experience of the Benedictine Order. This great movement preached work and study for God. The movement was so successful that the side results were economic gains undreamed of by St. Benedict. Only when work lost its Godlike character did it again become materialistic. Feeling at the conference was that we are now in another major phase where work again shows promise of entering a spiritual stage.

Morals In Business

Mr. Fairless, who led the business panel discussion, pulled no punches in saying what he believed. "Christian ethics," he said, "are an indispensable part of every successful business . . . and any enterprise which consistently fails to satisfy the moral, spiritual and human aspirations of those who work at every level of its operations will soon face economic failure as well. . . . I do not believe that a morally bankrupt business can long remain financially solvent in our modern free-market economy."

Book Planned

Rt. Rev. Richard S. M. Emrich, bishop of the Episcopal Diocese of Michigan, said: "How can we know the purpose of our work unless we know the purpose of our lives—since the same work can be a joy to one man and meaningless boredom to another it is silly to lay stress on outer and not inner change."

The entire proceedings will be published in book form in the hope that ideas expressed at the meeting will gain widespread distribution.

BENJAMIN F. FAIRLESS, president, American Iron and Steel Institute, is greeted by Hiland G. Batcheller, chairman, Allegheny Ludlum Steel Corp., and Tom Campbell, editor-in-chief, The Iron Age, at church conference.

Progress Noted

"There have always been business men who have practiced their religion seriously seven days a week . . . but in recent years I know from personal relations . . . that this characteristic is becoming a much greater force in our daily life . . ." —B. F. Fairless, president, American Iron and Steel Institute.

ACCIDENTS: How Much Do They Cost?

On-the-job accidents last year totaled up $3.2 billion, hit 1.8 million workers . . . National Safety Congress takes a healthy swing this year at big industrial headache . . . Cites safety Do's, Don'ts.

◆ ON-THE-JOB accidents may be costing you more than you think.

U. S. industry paid $50 per worker in 1954 to cover costs of injuries received on the job. Statistically, the money involved represents 1.8 million injuries. The visible and indirect costs total $3.2 billion. Where did the money go?

Safety engineers meeting in Chicago suggest a few specific means for finding out where and how the holes can be plugged. They say:

(1) Figure repair of damaged equipment and damaged workpieces that are involved in an accident as a direct cost; (2) figure workman's compensation, medical expense, any overtime required of other workers as a result of the accident, the costs for treating and re-treating injuries, time lost by the hurt employee on the day of the accident; (3) figure time lost for in-plant first-aid, and (4) figure cost of insurance and legal fees.

Don't Bury Costs

Safety experts believe the information resulting shouldn't be buried in accounting files. It's important, they point out, that management, the foreman, and workers know what accidents cost. Repeated doses of this type of information, it's noted, are excellent job-safety training for both front office and back shop.

Note: the use of the data doesn't end there. Compare plants where similar work is done to find which has the best safety-cost record. Then—find out why. If no two plants do similar work, check the present performance of a plant or department against its past history.

Know how much time is taken in trips to the plant dispensary or first-aid station. One method—first-aid passes signed by the job foreman, noting time spent getting to and from the first-aid station. Horse sense suggests, as one speaker points out, that a badly injured man won't wait while a form is filled out, but that the slip be used where injuries are slight.

An increasing number of companies send an employee to the company doctor on company time through the entire period of treatment, whether a quickly patched cut or a long-lasting skin infection. Some even supply a company car for the trip.

Attendees at the Safety Congress argue that this seems a needless expense. But advocates counter that: (a) the company knows the workman is getting proper treatment, and (b) they know where he's going to get it and how long it will take. While some states forbid the employer to specify a particular physician, it was suggested that the employer keep a certain control. It can mean avoiding a legal tangle later over an improperly cared for injury.

Cite Do's, Don'ts

Some do's and don'ts highlights include: "do" investigate the possibility of caging the die area on stamping presses. Check the possibility of double buttons requiring both hands for operating presses, or of long-push control buttons. Know that automation finds a friend in the safety engineer. Automatic feeds for stamping equipment can up production by 300 pct—also keep the operator's hands from being "mashed."

Industrial Accident Costs

The Box Score

1954	
Deaths	14,000
Injured	1,850,000
Man days lost ..	230,000,000
Permanent impairments ...	75,000
Total Cost	$3,200,000,000

(National Safety Council Statistics)

"Don't" penalize a foreman for time spent carefully reporting an accident. Don't allow the man reporting an accident to compose a gem as brief as one terse report which read, "man mashed finger." Says a Congress speaker, "that 'mashed' alone is good for an extra $500 in any court room." Don't dismiss safety training sessions on company time as a waste of money. One major corporation gives its plant personnel a 15 minute briefing on safety once weekly. The firm's reduced accident costs overbalance loss.

Mine Safety

Growing use of high-speed machinery in coal mines is increasing danger of gas explosions caused by friction, the U. S. Bureau of Mines warns.

During the past two years, the Bureau reports seven friction-triggered gas ignitions. Continuous mining machines were involved in three, cutting machines in three, and a coal drill in the other.

GOVERNMENT

AUTOMATION: Are Controls Necessary?

Capitol Hill probe into automation hears business, labor leader views . . . CIO's Reuther argues need for watchdog agency on mechanization, job dislocations . . . Benefits cited—*By N. R. Regeimbal.*

CURRENT CONGRESSIONAL hearings on automation are going to produce a lot of smoke, no light, and accomplish one thing—publicity. Business can't come out ahead.

The hearings, being conducted by a subcommittee of the Senate-House Economic committee headed by Rep. Wright Patman, D., Tex., cannot sponsor legislation. Rep. Patman says the group will make a report before the end of the year, and it's a good bet it will decry the possible economic damage to workers which automation can create "if not properly controlled."

The hearings were called at the insistence of CIO President Walter Reuther, who has built up a lot of popular support for his GAW and supplementary pay schemes by using the term automation. His next big push, admittedly, is to get to the 32-hour week, and he is already tying it in with automation at the hearings. He would also like to use the emotion the term creates to force legislation to increase government spending; expand social security, and get larger federal social welfare programs.

He also hopes Congress will direct the government to set up a special agency, probably in the Labor Department, to "keep tabs" on automation, its uses, and the employment dislocations it produces. He wants to use these figures to lever shorter work weeks for the same pay, with a goal of the 32-hour week — four days of eight hours each.

Reuther uses this technique: he agrees that automation is a wonderful thing—but he says we cannot permit it to come about without controlling "greedy, ruthless employers."

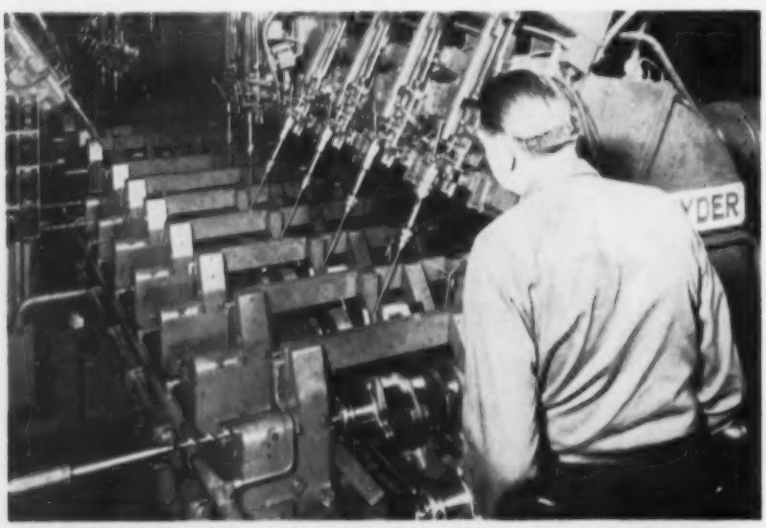
Businessmen at the hearings are arguing that without large-scale use of mechanization and automation, the high living standard we enjoy would not be possible. Automation, it's pointed out, is not a revolutionary development, but an evolution from earlier technological developments.

Without extensive mechanization, it's argued, the total work force today could not come close to producing the goods demanded by the public, industry and the military. Automation has actually met what would otherwise have been a labor shortage; and each new development creates new markets and eventually new jobs.

One witness, Don G. Mitchell, chairman and president of Sylvania Electric Products Co., tells the lawmakers that, unless development of mechanization moves ahead at a faster and faster pace, the country will be faced with a "disastrous labor shortage" in the years ahead.

Businessmen are agreeing with the labor spokesmen that automation tends to create short-term dislocations, and that retraining and job placement services by industrial firms as they automate are necessary.

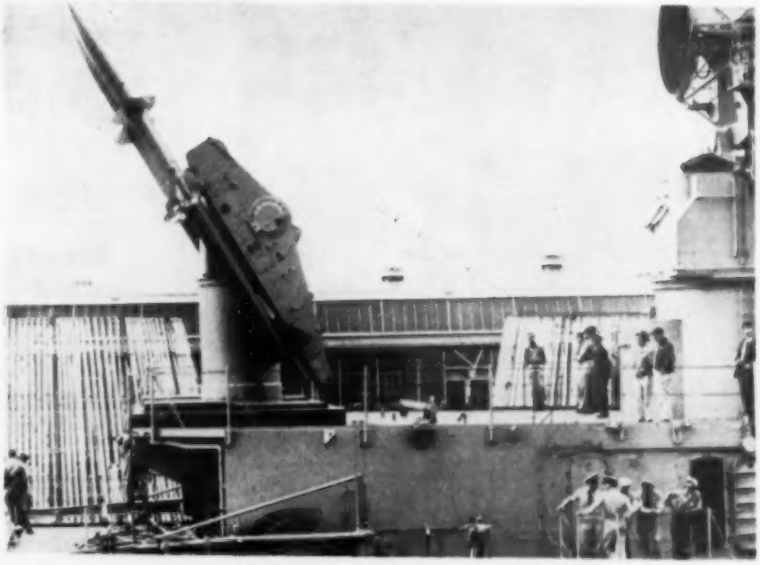
But no matter how powerful or persuasive are the arguments businessmen use to put automation in its proper perspective, the hearings and the subsequent subcommittee report will help the unions in their drive for short workweeks, guaranteed wages, and more government control over business.



LONESOME WORKER watches intricate production operation. Rapid automation advances are increasing worker productivity at a rate that has stirred union talk of shorter hours and brought on congressional probes.

Jeeps May Fly

The Army jeep of tomorrow may be the flying platform. It's still in the experimental stage, but Army planners think this one-passenger (or possibly two-passenger) treehopper of the future could be the answer to demands for reconnaissance, courier service, and less-than-carload shipments of troops.



MISSILE CARRIER: Guided missile sits in launcher on USS Boston, world's first missile cruiser. Shown at Camden, N. J., yards of New York Shipbuilding Co., ship is first of two guided missile cruisers under construction. Sister ship, USS Camberra, will be recommissioned next spring.

Shutdown:

Fight looms in move to close competing U. S. plants.

Administration officials are going to force a showdown with Congress on who has the final word on closing plants and ending services that compete with private business. Final round in the battle for control will come soon after Congress reconvenes in January.

Members of Ike's team are proud of their record of closing competing facilities; are bragging about it before businessmen, and they don't intend to see the anti-competition program scuttled.

Bar Plant Closing

But the House Appropriations Committee is just as eager for a showdown. In the latest maneuver, the committee criticizes the Defense Dept. for failing to "justify" its proposal to close 14 commercial and industrial plants, as required by "law," and demands that they not be closed until Congress reconvenes.

A provision of the current Defense Appropriation Bill bars closing plants without 90-days notice to the two appropriations committees, and permits either committee to veto a proposal. President Eisenhower, in signing the measure termed the provision unconstitutional and said it would be considered invalid by the executive department.

Aid Flood States

Firms located in flood areas now hold about $81 million in new Defense Dept. procurement contracts. In addition, another $27 million is being spent by the Army Engineers on rehabilitation projects in the disaster areas.

The total $108 million is being earmarked exclusively for firms injured by the floods of the past eight weeks that have hit portions of Connecticut, Massachusetts, New Jersey, New York, Pennsylvania, and Rhode Island.

Shift Tax-Am Reports

Firms constructing new facilities under government fast tax amortization certificates will now make progress reports to the federal agency concerned with their industry, and not the Census Bureau.

Office of Defense Mobilization, because of the reduced number of tax-amortization certificates outstanding, is shifting the responsibility for collecting progress reports to the various agencies, such as the Commerce, Interior and Agriculture Departments.

At the same time, ODM is asking firms who receive fast tax certificates and decide not to go ahead with construction to return the certificates to the issuing office for cancellation.

Tools:

U. S. lines up builders for wartime production.

Machine tool builders won't have to guess what their jobs would be in an emergency. The government plans to start signing contracts soon authorizing them to start production immediately in case of a new war.

New "trigger" contracts will go to each machine tool builder. They will become effective immediately under certain emergency conditions, or can be triggered by notification by the government.

Specify Types

Contracts will specify types, sizes, and quantities of machine tools a builder would produce in an emergency. Trigger contracts are expected to save more than a year in starting machine tool production, and will eliminate the bottleneck which retarded production in World War II and Korea, the government believes.

Provisions of the contract permit a tool builder to borrow up to 30 pct of the value of their emergency contract. The government will not buy the tools produced under the agreements, but will guarantee that the builders will suffer no losses under a rapid production speedup to meet emergency requirements.

Some legal and technical problems between the government and the industry are still to be ironed out before the contracts will begin flowing.

EXPANSION IN INDUSTRY

Armco:

Boost expansion expenditures

Armco Steel Corp. has increased expenditures earmarked for the 1955 expansion program from $60 million to a new high of $111 million.

This is expected to add a total of 1.176 million tons to Armco's present steelmaking capacity of 4.950 million tons. The program is set for completion early in 1957. The total capacity then, 6.126 million tons, will be 25 pct greater than at present.

All of Armco's plants will share in the expansion. Additions and improvements are scheduled for the Middletown and Zanesville, Ohio; Butler, Pa,; Ashland, Ky.; three plants in the Sheffield div.; coal mining facilities and certain subsidiaries.

Sixty per cent of the steelmaking increase will be centered in the Middletown plant, largest in the company. Butler, Pa., will get a new strip mill.

It is expected that most of the financing will result from earnings and depreciation. However, provisions have been made with a group of 18 commercial banks for a $50 million revolving credit fund.

Western Branch

Construction and renovation plans will add 38,000 sq ft to the Manhattan Beach, Calif., branch of the Stratos Div. of Fairchild Engine and Airplane Corp. Already underway, scheduled for completion in Feb. 1956 is a new 20,000 sq ft building. Renovation will start soon on an existing 18,000 sq ft unit. Of the total new area, 30,000 sq ft will be devoted to production, principally in the pneumatic field. The plant will produce equipment formerly made by Rhodes-Lewis Co., a subsidiary of McCulloch Motors Corp., recently purchased by Fairchild.

BOMB-LIKE instrument is an electromagnetometer, now available in the U.S. for airborne copper, zinc, lead and nickel prospecting. It detects and records graphically, sulfide ores which hold the sought minerals 80 pct of the time. In this plane it is mounted with a scintillation counter for radioactive metals.

Reactor

Kaiser Engineers division of the Henry J. Kaiser Co., will oversee construction of a mammoth, $15 million engineering test reactor (ETR) at the Atomic Energy Commission's reactor testing station, Idaho Falls, Idaho.

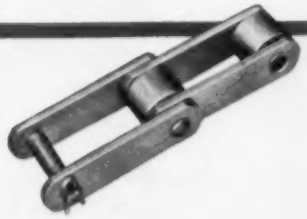
Reactor is a rush construction job needed for large experimental space in high neutron fields. Kaiser, selected over 34 other firms, will start work immediately.

Nuclear design of the reactor core and facilities within the tank will come from the atomic power equipment department of General Electric Co.

Expansion Briefs

- Aerobilt Bodies Inc. (Grumman subsidiary), new plant 60 acres, $350,000, increase production 75 pct; truck and trailer bodies; West Athens, N. Y.
- Aetna - Standard Engineering Co., addition to Ellwood, Pa., plant; $2 million; 40 pct increase in production, machining, welding, assembly.
- Pacific Coast Borax Co. (div. of Borax Consolidated); convert mining to open-pit, build new refining and concentrating plant; $18 million; Boron, Calif.
- Industry control dept., General Electric, new plant, Roanoke, Va.
- Alan Wood Steel Co., new four-high temper mill and pinwheel type coiler; Ivy Rock, Pa., $2 million.
- Belmont Works (Western Gear Corp.), addition to manufacturing plant, increase floor space 50 pct.
- Etna Machine Co., Toledo, Ohio; new plant Perrysburg, Ohio; $300,000, tube mills, tube cut-off machines.
- New Jersey Zinc Co.; new zinc mine in Tenn.
- Powdered Metal Products (div. Yale & Towne Mfg. Co.); purchase new plant, Addison, Ill.

For longer chain life, here's
less bushing and joint wear



Large-diameter rollers of Link-Belt SS chains reduce chain-pull due to frictional resistance.

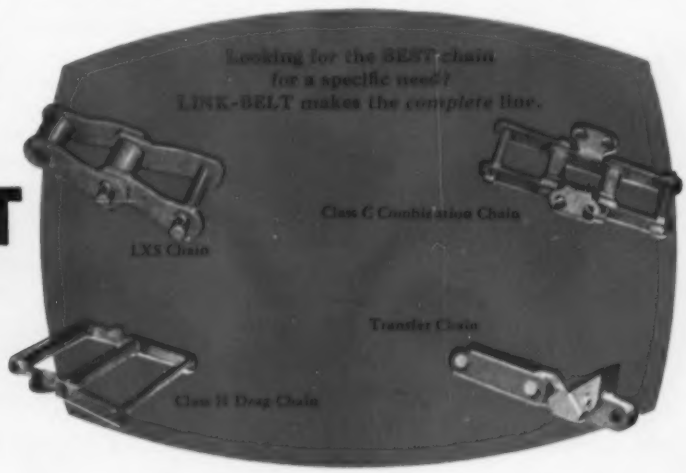
Link-Belt Class SS roller chain assures steady, even flow of fabricated products from medium-temperature industrial oven manufactured by The W. W. Sly Manufacturing Co., Cleveland, Ohio. Link-Belt precision steel roller chain and roller bearing blocks are also used.

LINK-BELT SS roller chains are designed for abrasive, heavy-duty service

FOR hard-working drives and conveyors, choose Link-Belt SS bushed roller chain. Its hardened steel joint assures longer life in gritty and abrasive applications. Accurately machined parts provide a firm, tight fit of pins and bushings in the steel sidebars. In addition, accurate control of raw material specifications and manufacturing processes results in uniformity . . . longer life.

Whatever your particular chain requirements in regard to speed, weight of loads or severity of service—the completeness of the Link-Belt line will provide the right answer. No other manufacturer offers such a broad range of silent and roller chains—of cast, combination, forged and fabricated types. And a complete selection of attachments permits efficient adaptation to varied services.

For help with any chain problem—big or small—call your local Link-Belt office or authorized stock-carrying distributor. He is qualified to make an unbiased recommendation of the one chain best-suited to your exact needs.



LINK-BELT

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LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 13.000

one is always out front

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How old is "antique"?

Recent Sciaky technical achievement in resistance welder design may make welders only five years old obsolete.

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Aluminum window frame production jumped 66% with two Sciaky 200 KVA Flash Butt Welders at the Reynolds Metals fabricating division in Louisville, Kentucky.

Three arc welder set-ups and five expensive jigs were eliminated. Labor demand for the welding operation was reduced 43%, releasing skilled men for other important work.

The Sciaky resistance welders now provide a completely water tight frame. Rejects are virtually eliminated. Maintenance has been reduced to minimum routine service. With all these advantages, it's easy to understand the 25% lower unit production cost.

"Resistance Welding At Work," Vol. 4 No. 7, details the Reynolds story. Write today for your free copy of this dramatic proof of Sciaky basic design thinking—welders to do *more useful work* at *lowest operating cost* with *maximum reliability*.

Largest Manufacturers of Resistance Welding Machines in the World

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Report to Management

Politics and Business

As weeks roll by, 1956 national elections loom larger on the horizon. As a businessman, you are concerned about the elections and what results will mean to you.

Few events have broader significance on world and national economics than the U. S. presidential race. Your concern is no doubt heightened by the probability that President Eisenhower will not be a candidate for reelection.

Business as a whole tends to favor a Republican victory. Prosperity under the present administration has given business confidence it has not had for decades. But any feeling of uncertainty you feel as next November approaches should not be permitted to grow into fear.

You can be sure that leading industrialists and bankers have no intention of retrenching because of an uncertain political picture. They know that the forces responsible for the present high level of business activity are not entirely attributable to the tenancy of the White House. Far from it.

What to Look For

But there are some rules of thumb that can be expected to affect your business. One concerns inflation. Right or wrong, there is strong feeling that a Democratic victory will mean moderate inflation.

For that reason, emphasis is being placed on procurement of goods for use or for inventory. If you watch the industrial picture closely, you can see this trend develop. Competition for scarce goods and materials will increase. Inventory building, which has not been a significant factor to date, will take on more significant proportions.

Defense spending will not decline regardless of which party wins next November. Democrats consistently fight defense budget cuts. Most Republicans feel that a heavy defense expenditure is not too big a price to pay for security.

Watch the Candidates

While no candidate of Mr. Eisenhower's stature is available in either party, it is likely that both will work toward a candidate who subscribes to the President's progressive moderation.

The extreme conservative wing of the Republican party is not likely to be a strong factor in the national convention. In the same vein, Democrats are not likely to nominate a candidate who could split the party, will settle on a "safe" candidate.

Republicans have started to come out of the defeatist attitude that followed the President's heart attack. You can be sure that the election is far from lost by the GOP at this date.

Automobiles are Symbols

When you see the 1956 auto models, look further than the bright trim and even beyond the horsepower ratings. Detroit's best efforts mean a lot to business and metalworking as a whole.

You can start with steel sheets, stainless steel, engines, copper, aluminum, paint, fabrics, plastics, highways, taxes, shopping centers, motels and take it from there indefinitely.

Industry leaders predict auto production rates next year almost up to this year's astounding pace. Effects will be translated into continuing prosperity for supplying and servicing industries.

In the past 15 years, the auto industry has been the outstanding example of an industry that will gamble with millions and millions in dies, machine tools, and all the things that go into new models, all before there is a signature on any order. Its ability to generate desire to buy is unequalled.

Sticky Bros., Inc., 4912 West 67th Street, Chicago 38, Ill., Portsmouth 7-3800

INDUSTRIAL BRIEFS

Atomic Modification . . . After nearly two and one-half years of continuous service the atomic engine in the submarine U. S. S. Nautilus is about to be removed from the ship for refueling and modification.

Convention Highlight . . . An exposition of the products and services of American Industry to be titled, "American Showcase" will be part of the Democratic party's national nominating convention in Chicago in 1956. It will be produced by Clapp & Poliak, Inc., N. Y.

Warehouse . . . Jones & Laughlin has acquired a new warehouse in the northwest section of Detroit. The facility will stock structurals, plate, bars, sheet and strip, stainless steels and wire rope.

Corrosion . . . The consulting research firm of Arthur D. Little, Inc., Cambridge, Mass., has developed a new process for inhibiting dangerous corrosion in Navy turbo-jet engines. The method employs corrosion resistant gases sealed into the jet engine each time it returns from a flight.

Stronger Bolts . . . Research by the American Society of Mechanical Engineers has come up with the following theory for the construction of stronger bolts: For maximum energy absorption the shank area of the steel bolt should approximate the mean or tensile-stress area of the threads, with minor corrections to compensate for work hardening produced by thread rolling or surface oxidation resulting from heat treatment.

Award . . . American Iron and Steel Institute received the 1955 Presteel award for their work in the field of metal stamping.

Purchase . . . For an undisclosed amount of cash and outstanding common stock the Detroit Harvester Co., has purchased the Peters-Dalton Co., Detroit. Harvester's new property, doing an annual business in the vicinity of $10 million on spray booths, washers and ovens will continue to operate with name and personnel intact.

New Organization . . . Lupear's Tool & Die Co., Farmington, Mich., has announced the formation of Portomag Sales Inc., to handle both foreign and domestic sales of its portable magnetic drill press called the Portomag. Headquarters will be in Ferndale, Mich.

Engineering Service . . . Engineering Service Inc. of America has been established in Detroit by Joseph Grum and Kenneth Martens to provide product design and development, manufacturing cost analysis and production engineering service.

Purchase . . . Plans agreed to by both parties call for the purchase of Cleveland Steel Barrel Co., by Inland Steel Co., for 18,463 shares of Inland stock. The deal is subject to clearance from appropriate government agencies.

TV . . . Retail sales of television receivers during the initial eight months of 1955 were 14 pct higher than in the same period the previous year according to the Radio-Electronics-Television Manufacturers Assn.

Symposium . . . More than 80 foreign scientists who have made contributions in the field of solar energy will participate in a world symposium on applied solar energy in Phoenix and Tucson, Ariz., Oct. 31 thru Nov. 4. Included will be soviet scientist Prof. V. A. Baum by special permission of the state department.

European Acquisition . . . Clevite Corp., Cleveland, has acquired all the outstanding capital stock of Intermetal G.m.b.H., of Dusseldorf, Germany, for an undisclosed purchase price. The German company, second largest of its type in Europe, will operate in conjunction with Transitor Products, Inc., a Clevite unit in Waltham, Mass.

Addition . . . Hallden Machine Co., Thomaston, Conn., has completed an addition to their factory which increases floor space by 60 pct.

Grant-In-Aid . . . International Nickel Co. has given Boston College a grant-in-aid for research on oxygen reduction overvoltage of metals.

Glass Seal . . . Seals Ltd., has been organized in South Pasadena, Calif., by W. P. Speer to design, manufacture and sell glass seal connectors for the electronics industry.

Coal Opposes . . . Tom McGrath, general counsel of the Fuels Research Council, Inc., representing the coal producers and railroads, will oppose in counterproposals to the Federal Power Commission a request by gas companies for aid to build a pipeline to import natural gas from Canada.

High Speed Camera . . . Beckman & Whitley, Inc., San Carlos, Calif., manufacturer of analytical high speed cameras has announced a service for customers with custom projects not big enough to warrant the outright purchase of the necessary equipment.

Gift . . . Wheeling Steel Corp., has given as a gift, properties it had owned, valued at $30,000, to the village in which they were located, Beech Bottom, W. Va.

YOU CAN COUNT ON CONTINENTAL FOR EVERY FASTENER NEED!

Only Continental Offers You All 14 Types of Tapping Screws!

Here's another reason why Continental can help cut your fastener costs

Continental is the only producer making all 14 types of thread-forming and thread-cutting screws. These are part of Continental's vast selection of standard screw styles and sizes which number over 1,756,000.

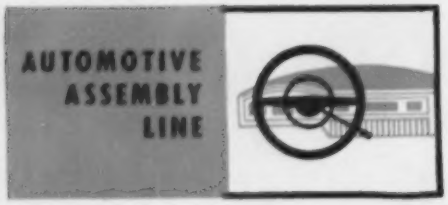
This gives you the largest choice in the industry and, combined with Continental's top position in the production of special fasteners, it guarantees faster service and a top-quality product.

Continental will back you up with over 50 years experience, and we are proud of our hard-earned slogan—*You can always count on Continental for every fastener need.*

Continental Screw Co.

Manufacturers of Holtite Fastenings

NEW BEDFORD, MASSACHUSETTS, U. S. A.



Station Wagons Show Changing Times

New body styles are products of changing living habits and improved manufacturing methods . . . Hardtops threaten to take second place in stylings . . . Move to suburbs boosts station wagons—By T. L. Carry.

◆ INCREASING POPULARITY of station wagon and hardtop body styles is beginning to sound the death knell for the standard 2-door and 4-door sedans.

Prior to World War II, the 2-door sedan accounted for as much as 54 pct of all production with the 4-door running second and accounting for over 41 pct.

The 4-door sedan reached its peak of popularity after the war and, by 1952, 52 pct of all cars made were 4-doors. In the meantime, the 2-door was steadily declining and by the same year production had fallen to 29 pct.

Behind the Decline . . . There are several factors behind the rise and fall of these two body types. Prior to the war, producers found that both types of sedans answered the needs of motorists and were the easier to make. With the advent of more modern production methods, the industry found that it was about as economical to produce other types of cars.

The introduction of the hardtop in 1950 found the public ready and willing to buy it. The relative newcomer has gained every year since it made its debut and is expected to capture second place in the popularity race this year.

The 4-door sedan is still the number one choice but factory production is estimated at less than 41 pct.

Another body type which will be taking up more and more production in 1956 is the station wagon.

There is nothing new about the station wagon. Some models were offered by automobile companies as early as the 1920's and featured bodies that were made of wood. Ford Motor Co. was the first to produce them in any quantity in 1932 and, by 1941, 15 makers were turning them out on both passenger car and truck chassis.

Demand was limited because all of the early models had wood bodies which had a tendency to discolor and, in some cases, warp.

Refinements in design and the advent of the all-steel body after the war fulfilled a growing need for a vehicle that could serve both as a passenger and cargo carrier.

Station Wagon Trend . . . An indication of the increase in demand for station wagons can be had from production figures. In 1940, station wagons accounted for less than 1 pct of total production. Last year 6.3 pct of all cars produced were station wagons. For the first 6 months of 1955 over 350,000 of the vehicles were produced and industry sources expect total production this year will account for over 9 pct of the market.

No estimate has been made on the number of station wagons that will be built in 1956 but at least two companies are planning to increase production. Ford has increased its station wagon capacity by 70 pct and Pontiac Motor Div. says it plans to make 80,000 of the vehicles next year.

Need More Seats . . . One of the reasons for the increase is the growing number of families with small children. The station wagon satisfies the need of the large family for transportation and yet is glamorous enough so that it doesn't look like a small truck.

At the same time, the shift in population to the suburbs has increased the need not only for a second family car but one that will serve as a utility vehicle. A great many suburban dwellers are do-it-yourself enthusiasts and they find that a station wagon makes it possible for them to haul tools and materials.

Off Limits . . . Russian newsmen touring Detroit until the Soviet Union agrees to permit American reporters into restricted areas in Russia.

State Department officials turned down a bid by the Red newshawks to poke around the auto and defense industries at Detroit because

The Changing Picture

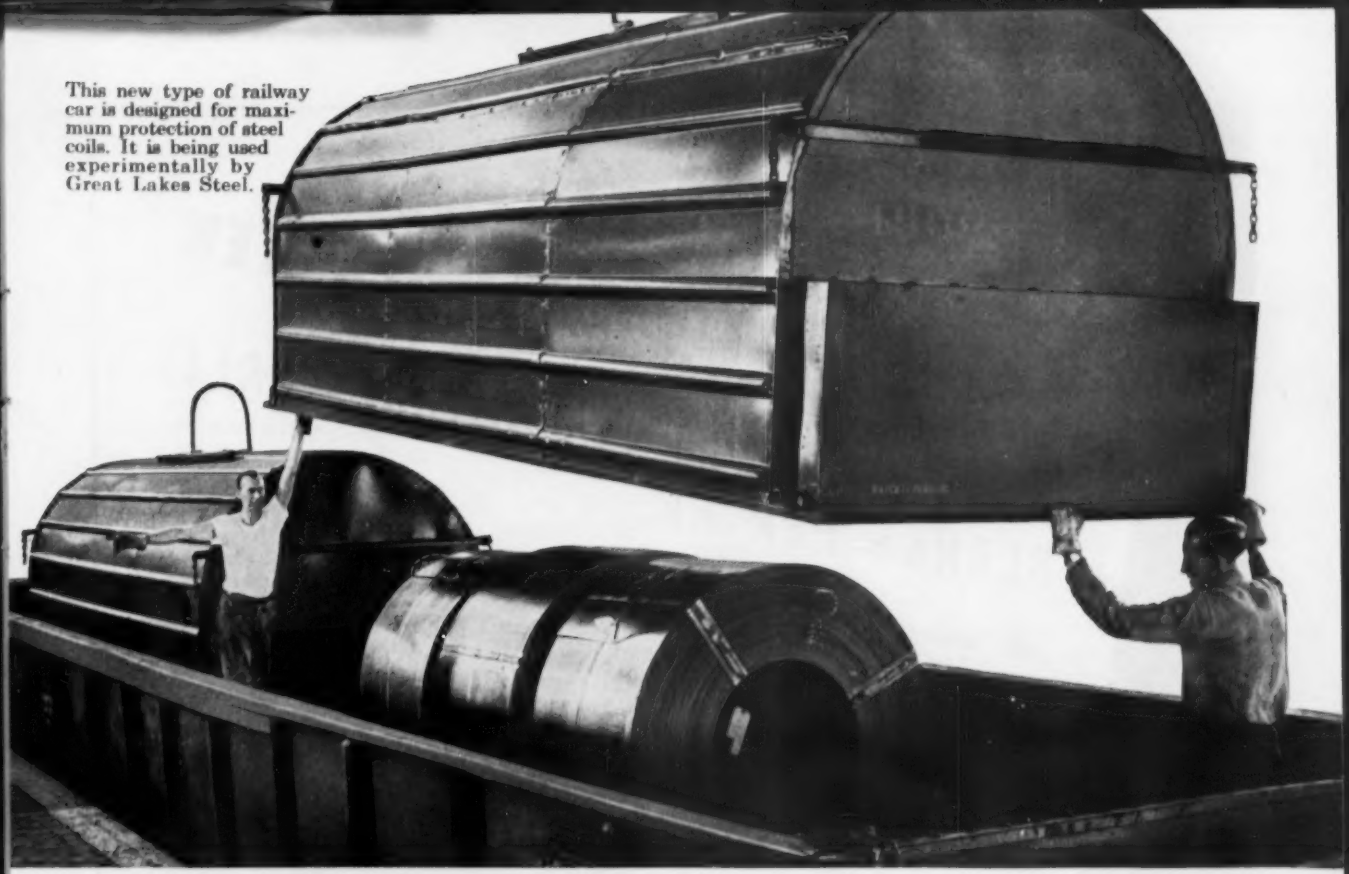
Station Wagon Production

1940	25,098
1952	169,036
1954	349,050
1955	470,000*

Hard Top Production

1940	none
1952	539,508
1954	954,519
1955	1,500,000*

*estimate



This new type of railway car is designed for maximum protection of steel coils. It is being used experimentally by Great Lakes Steel.

How Great Lakes Steel *delivers* quality

Another order receives individual attention as sheets of steel are wrapped with a waterproof covering and banded to meet the customer's specifications.

Steel coils (below) are securely blocked on a truck and trailer at Great Lakes Steel. Heavy tarpaulin cover is provided by truckers as standard equipment for additional protection.

The emphasis on quality at every stage of production at Great Lakes Steel extends right on through to the Delivery Department. There, careful attention is given to handling and packaging each coil and bundle to make sure that the customer receives his order in prime condition.

The Delivery Department has another important responsibility, too. It must see that our products reach each customer in ample time to meet his production schedules.

For quality with service—that extends all the way from the beginning of our operations to the end of yours—call on Great Lakes for your flat-rolled steel requirements.

GREAT LAKES STEEL CORPORATION

Ecorse, Detroit 29, Michigan • A Unit of

NATIONAL STEEL CORPORATION

District Sales Offices: Boston, Chicago, Cincinnati, Cleveland, Grand Rapids, Houston, Indianapolis, Lansing, Los Angeles, New York City, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Toledo, Toronto.

NEW!

WATERBURY FARREL SLOTTER

"Model 5"

DELIVERS UP TO 51,840 (BURR FREE) BLANKS PER HR....

SLOTS STANDARD & SPECIAL SCREW HEADS, FERROUS OR NON-FERROUS BLANKS #6 TO ¼" DIA., UP TO 2½" LONG, AT VARIABLE SPEEDS FROM 60 TO 864 PER MINUTE.

ONE "Model 5" Outproduces TWO Earlier Type Slotters

The speed and work range of this completely new Waterbury Farrel slotter make it more productive than a *pair* of earlier type slotters which used indexing dials and saw-into-work sequence.

The "Model 5" has long and short run versatility, too. Its simplicity and rapid set up make it economical for short runs while its high speed pays extra dividends on long runs.

Inexpensive Tooling

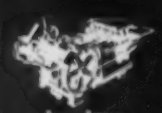
The only tooling required is a saw and burr-remover blades made inexpensively from spring steel. One dial, furnished as standard equipment feeds the above range of blank diameters. Special dials can be furnished for other blank diameters.

WATERBURY FARREL
Foundry and Machine Company
WATERBURY, CONN.

Branch Offices: Chicago • Cleveland • Millburn, N. J.

For further information, write for free bulletin or contact your nearest WF representative, today.

Bolt, Nut & Screw Machinery


Power Presses

Rolling Mill Machinery

Wire Mill Equipment

Sendzimir Mills & Other Special Machinery

WATERBURY FOUNDED 1851 FARREL

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Oct. 22, 1955	144,415	27,524
Oct. 15, 1955	105,528	25,250
Oct. 23, 1954	48,289	14,087
Oct. 16, 1954	46,253	13,258

*Estimated Source: *Ward's Reports*

the Kremlin refuses to reciprocate. Detroit has been off limits to Russians since last January.

Russian officials listed Detroit as one of the places the Red newsmen would like to visit on their current tour of the U. S., but dropped the idea when the U. S. asked for permission to send American newsmen to restricted areas in the Ural Mountain area.

4-Day Work Week?

There might not be any immediate prospect of the 4-day work week being adopted in the automobile industry, but probably more than one labor negotiator in Detroit is secretly shuddering since Walter Reuther's latest pronouncements on the subject in Washington.

People here remember the lengthy propaganda barrage that preceded adoption of the controversial supplemental unemployment benefit plan (SUB) and are wondering if the shorter work week will be one of the UAW demands in 1958.

The psychology of the union leader is such that he must always give the membership the impression that he is fighting for more and better things. Now that Mr. Reuther has established a semblance of the GAW principle, he must look to other fields to impress his union.

Prediction:

60 million cars in the next decade.

Automobile executives are accustomed to making yearly forecasts on the market potential for their own companies and the industry generally. But F. C. Reith, general manager of Ford's Mercury Div., has come up with a 10-year prediction which is, as usual, very optimistic.

Mr. Reith claims that upwards of 60 million passenger cars will be sold in the next decade. That's at least 6 million cars a year and the prediction is based mainly on two things—an increase in population coupled with more production.

Build Sales

The record sales this year have not been borrowed from the future, according to Mr. Reith, but have formed the basis for future sales.

Auto production is no longer based principally on the need to replace worn out equipment but on the growth of people's willingness and ability to buy cars.

In the next 10 years, Mr. Reith says, there will be a continuous upgrading of desires all along the line. The industry has already experienced an upward movement from non-owners to owners and to families that now have two cars. He predicts that the desire for higher-priced cars will also increase as will the number of purchasers who will want the maximum in automatic equipment on their autos.

AUTOMOTIVE NEWS

New Models:

Cadillac, Clipper have more power, new features.

Two more new cars are being introduced to the public this week, Cadillac and the Packard Clipper.

Cadillac is the first car to offer an aluminum grille which is available at extra cost in either a gold or silver color.

In addition, the car has an improved Hydra-Matic transmission with a new fluid coupling. The coupling controls the amount of oil necessary to operate the transmission and eliminates to a great extent previously noticeable shifts in the Hydra-Matic. The use of sprag clutches cuts maintenance.

Torsion bar suspension is standard equipment on all the 1956 Clippers. It is the first time that torsion bars have been offered on an American car in the upper-medium price field.

THE BULL OF THE WOODS By J. R. Williams

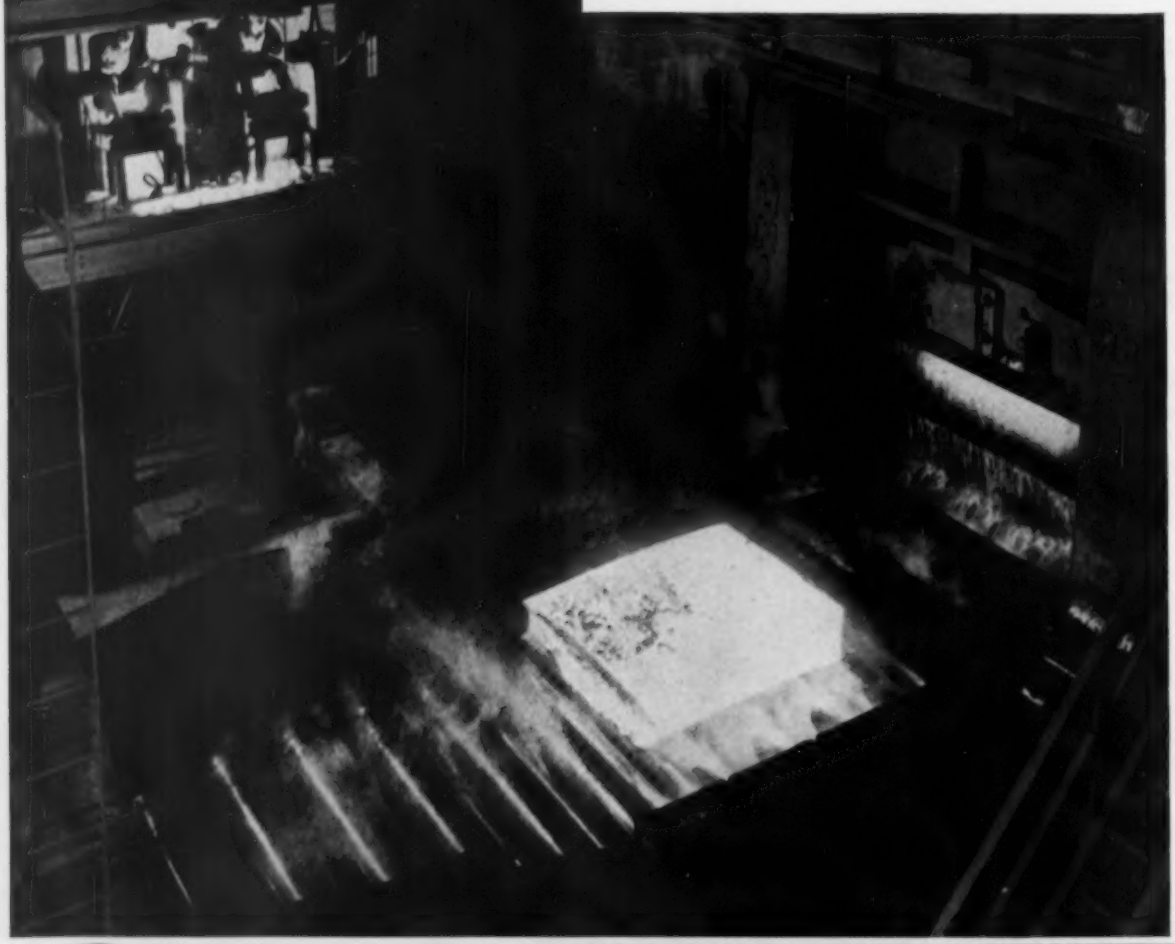
CARLS SALOON
BAR
SEE WHAT THEY'VE BROUGHT ON US--SOME GUYS ON TH' NIGHT SHIFT SNEAKIN' OUT TO GET A QUICK BEER!
IT'LL MAKE IT WORSE! YOU DON'T TOUCH TH' STUFF, BUT THAT PRESENTS A CHALLENGE TO YOUR UNUSED LIBERTY AN' MAKES YOU MAD, SO IN RESENTMENT YOU'LL BE CLIMBIN' TH' FENCE AN' SOON HAVE A BEER BELLY TOO!
BORN THIRTY YEARS TOO SOON
10-24 J.R.WILLIAMS

Cold facts about hot steel

IT'S a fact—just a fraction of a cent saved per pound adds up to considerable extra profit on every ton of steel you roll. And there's only one way to get these savings—make sure all your machinery and equipment runs at maximum efficiency, minimum upkeep cost. Let Texaco help you.

For example, use *Texaco Meropa Lubricant* on enclosed reduction gears and their bearings. Its high EP stability and resistance to oxidation mean smoother operation, longer gear and bearing life.

A Texaco Lubrication Engineer can help keep you rolling toward greater profits while keeping your maintenance costs low. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.



TEXACO

TEXACO Lubricants, Fuels and Lubrication Engineering Service

TUNE IN... TEXACO STAR THEATER starring JIMMY DURANTE on television... Saturday nights, NBC.

Why Defense Spending Won't Drop

Sec. Wilson sees next year's outlay near $35 billion . . . Rising material costs, troop pay hikes and jet bomber program bar cuts . . . Armed strength will stay close to 2,850,000—By G. H. Baker.

◆ GOVERNMENT spending for defense isn't going to drop much below the $34.5 billion mark in the year ahead, and actually will tend to nudge closer to the $35 billion mark.

Defense Sec. Wilson is emphasizing this point in the White House huddles on ways to trim the total national budget below the $62 billion mark. Wilson specifically makes these points:

1. Steel, copper, and aluminum —all of which figure importantly in Defense Dept. procurement— cost more than a year ago.

2. The "distant early warning" (DEW) network across Northern Canada is costing more than was anticipated.

3. Accelerated buying of B-52 jet bombers and some fighters has knocked earlier budget estimates into a cocked hat.

4. Higher pay and fringe benefits for the troops is draining payroll funds faster than expected.

Total defense spending probably will be "a little higher, rather than lower" in 1956, Mr. Wilson predicts. As far as troop strength of the Army, Navy, and Air Force is concerned, he says the total will stay around 2,850,000—down from the 3,500,000 peacetime high when the Eisenhower Administration took office two years ago.

Push Air Weapons . . . A new Pentagon committee is plotting ways to juice up the output of aircraft weapons.

Secretary of Defense Charles Wilson has named 10 of his top procurement experts to serve on the new committee.

Immediate job of the committee is to concentrate on ways of speeding output of weapons on manned aircraft, including helicopters. But later the group may turn its attention to unmanned craft, such as guided missiles and electronically-operated devices.

Basic assignment from Wilson is to turn up ways of cutting down the length of time required for developing weapons — from concept to inventory. The committee will delve into research, development, procurement, and production.

Fight Bias . . . Sixty-five of the nation's top industrialists are meeting behind closed doors in Washington this week to talk up tough new rules for stamping out discrimination (both racial and religious bias) in plants doing government work.

Meeting is being held under the aegis of President Eisenhower's Committee on Government Contracts. Vice-President Nixon is presiding.

Although the committee lacks any specific enforcement power, it is able to beat down discrimination in many plants simply by putting the heat of moral suasion on the company and union officials concerned.

V.P. Sees Progress . . . Mr. Nixon opened the meeting with this observation:

"Industry has made tremendous progress toward providing equal job opportunity in the past several years. We want this story to be shared among leaders of industry.

"We want . . . to convey to the leaders of industry the serious purpose of the government in its determination to press forward its program for eliminating discrimination in employment."

Freight Load Shifts . . . Railroads no longer carry more than half the nation's freight, new government figures disclose. A new Interstate Commerce Commission study of freight shipments show that the volume of freight carried by railroads has slipped below 50 pct (49.5 pct) for the first time in history.

This means that trucks, ships and barges, pipelines, and air-

Okay Plush Tab

Interstate Commerce Commission, well-known for its thorough investigations, decides after a year of probing that there is nothing improper in a trucking firm's outlays for entertaining customers and others at a plush Canadian lodge.

ICC says tersely that it is dismissing complaints against Riss & Co., Kansas City, Mo., trucking firm, "for good cause." The agency offers no further explanation.

Engineered by Tinnerman...

NEW SNAP-ON MOTOR CLIP REPLACES 4 PARTS

Cuts Assembly Time and Costs!

If you manufacture or use fractional horsepower motors, this new Tinnerman SPEED CLIP® can lower your parts and assembly costs by eliminating 4-piece screw clamps to hold motors in place.

Made of high-quality spring steel, this SPEED CLIP is quickly snapped into place over the resilient motor-mounting ring, using a simple hand tool. It forms a vibration-proof lock that won't shake free. Assembly time is reduced because of the one-piece construction . . . no loose parts to handle, nothing to tighten. Parts cost and assembly cost are reduced as much as 75%!

These SPEED CLIPS can be provided in sizes to fit any fractional-horsepower motor. They are designed to hold tight even under severest vibration and high starting-torque in any mounting position.

Ask your Tinnerman SPEED NUT sales engineer for more information and arrange for samples to test on your own assembly line.

TINNERMAN PRODUCTS, INC. • Box 6688, Dept. 12, Cleveland 1, Ohio
Canada: Dominion Fasteners, Ltd., Hamilton, Ontario. *Great Britain:* Simmonds Aerocessories, Ltd., Treforest, Wales. *France:* Aerocessoires Simmonds, S. A., 7 rue Henri Barbusse, Levallois (Seine). *Germany:* Hans Sickinger GmbH "MECANO", Lemgo-i-Lippe.

TINNERMAN Speed Nuts®
FASTEST THING IN FASTENINGS®

planes now carry a majority of all freight shipped.

Railroad share of the national shipping dollar has been on the downgrade for years, but has always remained comfortably above the 50 pct mark.

Now, rail management doesn't know which way to turn. Faced with inadequate income, they have pushed up their rates—only to find this drives still more customers to trucks and waterways. It's a frustrating position, to say the least.

Natural Gas:

Import, export plans stir rail and coal anger.

Two natural gas transmission firms are going to have a tough time getting approval of a proposal to import Canadian natural gas into the Northern Midwest states and to export American gas to Eastern Canada.

Coal producers, railroads and some labor groups are all opposing the plan before the Federal Power Commission on the grounds it is "merely another attempt to have Americans subsidize the building of the all-Canadian natural gas pipeline."

Coal Men Oppose

The two firms, the Tennessee Gas Transmission Co., and a newly-formed affiliate, Midwestern Gas Transmission Co., are seeking permission to import Canadian gas for distribution in Minnesota, Wisconsin, Michigan and North Dakota. They want to export American gas at Niagara Falls to markets in Eastern Canada until a proposed all-Canada pipeline from Alberta to Toronto is built.

Opposing groups include the National Coal Assn.; American Coal Sales Assn.; The Anthracite Institute, Fuels Research Council, Inc., and the Brotherhood of Railroad Trainmen.

Opponents argue that the proposal "would deal a cruel and needless blow" to the coal industry, and its workers, and to the "vital railroad transportation systems" of both countries.

Decision Will Cost

The U. S. Supreme Court, in a decision expected to cost the government millions of dollars in tax rebates, ruled that the World War II War Production Board exceeded its authority when it limited rapid tax write-offs to less than the full cost of defense plants.

Under the ruling, the Ohio Power Co., which was permitted to amortize only 35 pct of a new generating plant, collects $4,885,388 to compensate for WPB's refusal to amortize the entire plant.

Thus firms which built defense facilities during World War II under the old NPB fast tax amortization program and did not receive tax benefits for the full cost can now apply and collect the difference from the government.

WPB's policy was to withhold full amortization if the facilities could be used after the war.

Government attorneys say there are 39 similar suits pending in the court for $62 million in rebates. The law was changed in 1950.

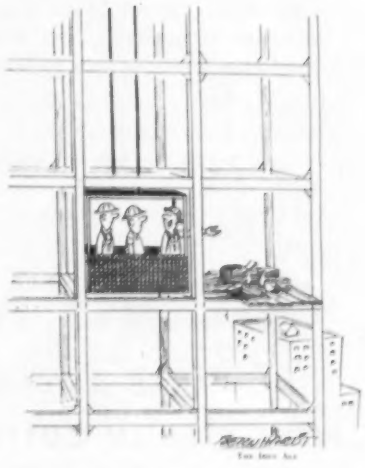
How to Use Titanium

Some recent experiences in fabricating titanium are described in a new government report.

It has been found that improved flow of metal and better surface finish result if conical dies, rather than flat dies, are used in extrusion. Optimum die angle is found to be about 130°.

Also, optimum mechanical properties are attained at extrusion temperatures in the alpha-phase region for alloyed titanium, and in the alpha-beta region for Ti-3Mn.

The Office of Technical Services, U. S. Department of Commerce, is selling copies of the report (PB 111696), "The Extrusion of Titanium," for $2 per copy. (Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C.).



"Fourteenth floor . . . ropes, cables, gusset plates and rivets."

Boom:

Manufacturing leads big jump in working capital.

Manufacturing concerns are the pacesetters as U. S. corporations raise their net working capital to new record levels.

Analysis newly disclosed by the Securities and Exchange Commission shows corporate working capital climbed to a peak of $100.6 billion as of June 30.

The April-June increase of $2.5 billion was the largest quarterly upswing since the second quarter of 1950. During the first quarter this year, the rise was $2.3 billion.

Corporations Invest

Accounting for the bulk of the second-quarter gain, with an increase of $1.8 billion, were manufacturing firms. Trade and finance companies registered advances of $400 million and $200 million, respectively. Most other categories made small gains, but gas utility and communications firms reported declines.

Corporations invested more than $6.1 billion in plant and equipment during the second quarter. About 80 pct of the funds to finance expansion came from retained earnings and depreciation accruals. Net long-term borrowings amounted to $1.5 billion.

On the Trail of Trouble!

This auto plant had conveyor belt trouble. A Socony Mobil man cured it—saved $1,300 per hour!

Grease spots plagued this large felt mill. A Socony Mobil man ended them—saved $10,000 a year!

These coal miners kept breaking down. A Socony Mobil man stopped this—saved $8,720 annually!

This Flying Red Horse "Sleuth" can solve your problems, too!

His name may be Smith or Jones or Brown. He may be tall or short—blonde, brunette or redhead. But, in each case, he is a master "sleuth"—skillfully trained to track down the culprits that may be robbing your plant of production, material, money.

He is your Socony Mobil man—a lubrication expert who has solved thousands of mystifying cases of trouble in industrial plants. And he has saved plant owners literally millions of dollars with his solutions.

His exploits, in case histories like those reproduced here, are well worth reading—give clues to how he may save money in *your* plant. Now you can read more about him in a special issue of our magazine—"OIL POWER"—just off the press. It will pay you to get a copy. Just write: Socony Mobil Oil Company, Inc., 26 Broadway, New York 4, N. Y.

SOCONY MOBIL

Correct Lubrication

FIRST STEP IN CUTTING COSTS

SOCONY MOBIL OIL CO., INC., and Affiliates: MAGNOLIA PETROLEUM CO., GENERAL PETROLEUM CORP.
Formerly Socony-Vacuum Oil Company, Inc.

WEST COAST REPORT

Orders Mean West Aircraft Expansion

New orders for airliners assure continuous work through 1956 . . . Lockheed and others plan big expansion programs . . . Pan Am places first order for jets . . . Boeing, Douglas split—By R. R. Kay.

◆ FAT NEW AIRLINER contracts are landing safely in West Coast aircraft plants. This means checks will pour out to many thousands of subcontractors and suppliers throughout the U. S.

There'll be continuous work through 1960 for aircraft manufacturers here, spawning ground of 100 pct of U. S. airliners.

Planemakers here are revving up for huge expansion to take care of the skyrocketing commercial business. Manufacturers of products used in the metalworking industry can look for a steady flow of orders.

The aircraft industry has the money—and it's going to spend it. Here's proof:

Need Facilities . . . Lockheed Aircraft Corp. plans to spend at least $125 million for expansions in the next five years. President Robert E. Gross predicts that to remain competitive, aircraft makers are going to have to invest more heavily in company-owned high-speed wind tunnels, laboratories, nuclear reactors, new test devices, and modernized manufacturing and flying facilities for bigger and faster airplanes.

And THE IRON AGE has information that another major aircraft company here will spend over $100 million in the next few years for new equipment and facilities.

Trend is away from nearly total dependence on military business. Commercial backlogs, now as high as 25 pct, are up from a recent 9 pct. Backlog: Now $1 billion—up almost 300 pct since early 1955—and highest in history. Watch it zoom another half billion!

Jets for PanAm . . . Pan American World Airways just ordered 45 jet transports to cost $269 million—largest order in commercial aviation history. This marks U. S. entry into the jet transport age in a big way.

And the Pan American order is only the icebreaker. Any minute, more huge jet airliner orders are due from: American Airlines, Eastern, TWA, and United. All these will add up to the $600 million predicted in THE IRON AGE "West Coast Report," September 1, 1955.

Both Boeing Airplane Co. and Douglas Aircraft Co. won their running battle for the jetliner business. Each got a nice slice of the PanAm order: Boeing $100 million, Douglas $169 million.

Although the aircraft industry is a modern-day Goliath, subcontractors cash in heavily—get about 50 cents of the aircraft sales dollar. Small business firms, 83 pct of the 50,000 subcontractors, received $4.7 billion from the industry last year for both commercial and military work.

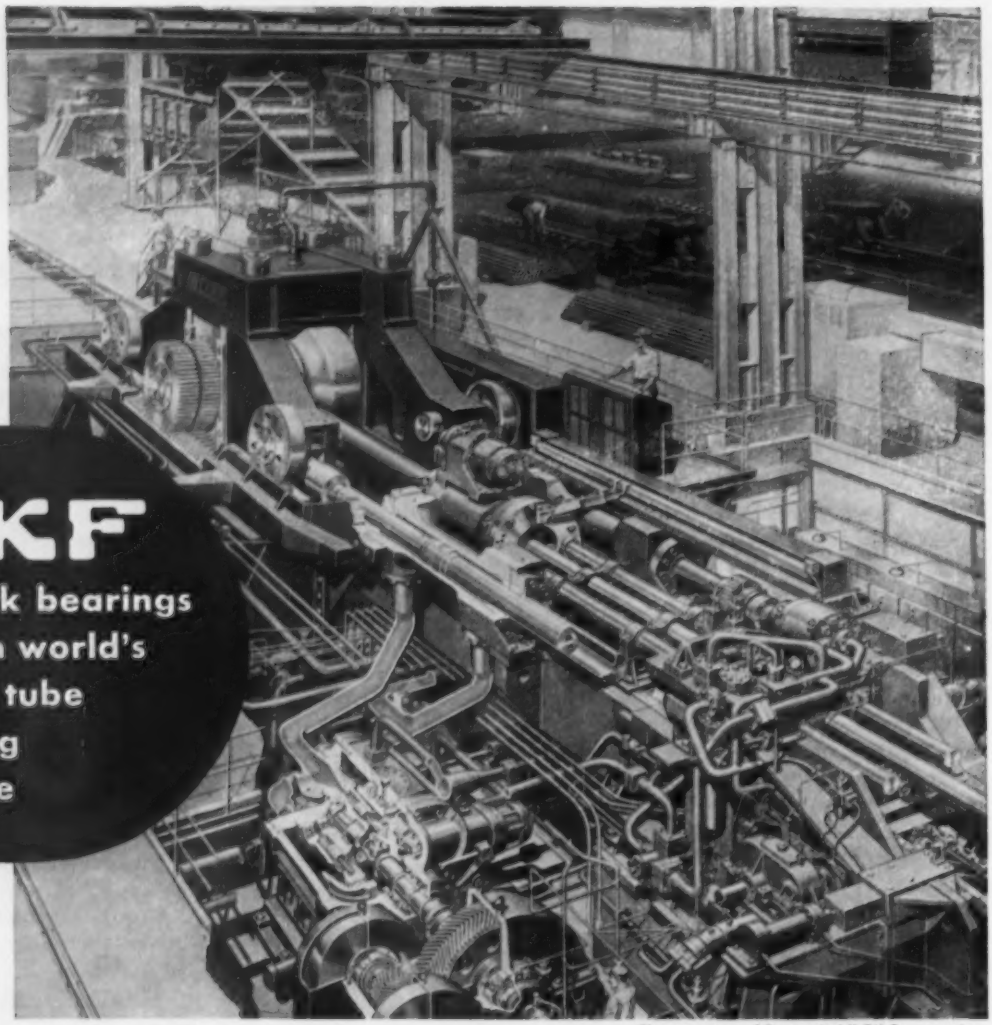
"We're trying to raise enough to meet this week's payroll!"

Seek Subcontractors . . . Planemakers are always alert for new subcontracting sources. They've got teams of specialists out searching for prospects. When they spot a qualified firm, these experts help the outfit get set up as a supplier.

Subcontractors and suppliers to the industry are spread across the 48 states. California leads with over 10,000 firms. Then come Ohio, 4500; and New York, 3300.

Research . . . Southern California is celebrating its 75th anniversary and the 50th year engineering courses have been offered by making plans for a new industrial research center to be built on the campus at a cost in the vicinity of $1 million. Three of the four planned new units will house labs for work in mechanical and aeronautical engineering, electronics and electrical engineering, chemical and petroleum engineering. The other will be a headquarters.

University officials claim the new facilities are necessary because in addition to its regular basic research program, they are handling 311 sponsored research programs for industry and government agencies totaling over $2.5 million.



SKF

roll neck bearings used on world's largest tube reducing machine

Photo courtesy of Socony Mobil Oil Company Inc.

SKF sphericals absorb tremendous punishment, provide greater bearing capacity

This 102 foot long giant tube reducing machine, designed and operated by Tube Reducing Corporation, Wallington, N. J., for the U. S. Navy Bureau of Aeronautics, and built by E. W. Bliss Company, Canton, Ohio, puts a 3½ million pound squeeze on precision tubing of outer diameter sizes ranging from 9 to 17 inches for military and commercial cold finished tubular products.

The mammoth bearings for 50" diameter rolls on the machine are SKF Spherical Roller Bearings. They are the largest spherical roller bearings of this type ever made, with a rated capacity of 3,200,000 lbs. Each bearing weighs 5150 lbs.; individual rollers weigh 39½ lbs.

The Tube Reducing Corporation first employed SKF Spherical Roller Bearings in 1937 for a 2¼" tube reducing machine having 13" diameter rolls. Today, *all* tube reducers in this plant are SKF-equipped... from the smallest to the 102 foot giant.

Like the men at Tube Reducing Corporation, organizations that pioneer advancements in their fields are accustomed to find that SKF matches their vision with advanced bearing design that helps them make a working reality of their most ambitious and forward-looking plans.

Make SKF Engineering cooperation a *plus* factor in the successful realization of your company's planning and development program. 7631

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA., *manufacturers of* **SKF** *and* HESS-BRIGHT® *bearings.*

SKF®

BALL AND ROLLER BEARINGS

MACHINE TOOL HIGH SPOTS

New Cutting Material Stirs Interest

Carboloy's cemented oxide impressed viewers in Chicago Show demonstrations . . . Speed, smooth finish, long life cited . . . Company admits question marks, sets sales date—By *E. J. Egan, Jr.*

◆ IF YOU'RE interested in high speed machining, say at speeds up to 7500 sfpm, your interest can be something more than academic on or about January 1, 1956.

Carboloy Dept. of General Electric is going all out to have its new cemented oxide cutting material available in limited sizes and shapes by that date.

The firm yanked this product out of its test lab just before the recent Machine Tool Show in Chicago. Several machine tool builders agreed to demonstrate it on high speed equipment at the Show.

The demonstrations attracted much attention, apparently convinced builders and visitors alike that the material fully lived up to the cautious claims made for it.

Finish Pleases . . . High speed finishing cuts (up to 2500 sfpm in some demonstrations) produced exceptionally smooth surfaces on steel workpieces; bits were cool to the touch even though no coolant was used; and resistance to edge wear appeared to be very good.

In answer to numerous requests for further information, as well as for usable forms of the cemented oxide itself, Carboloy officials decided to put the material on the market as soon as possible. The company frankly admits it doesn't know all the answers. But it hopes that as sales mount to venturesome customers, these firms will report back on their experiences.

In a photomicrograph, the cemented oxide shows a two-phase structure, is said to be neither a typical ceramic nor a cermet. One of the two phases is aluminum oxide, although this is not the predominant component. Blanks of the new compound, which was developed specifically for cutting and wear applications, are produced by powder metallurgy techniques from materials that are in abundant supply.

Tool Lasts Longer . . . On some tests, indicated tool life for the cemented oxide would be about 25 times that of carbides used for the same job. This leads into the all-important cost area. Carboloy has paid little attention to cost and price structures for the new material thus far. However, it is certain that prices of the oxide blanks will be higher than present grades of cemented carbide.

"Pardon me stranger—How about a friendly game?"

But if cemented oxide tools will take finishing cuts faster than carbide tools, and also outlast them, net tool cost per piece machined could very well be reduced.

Consult Designers . . . Outward appearance of an increasing number of machine tools indicates that builders have been consulting industrial designers. One industrial designer says that appearance should be last on the list of considerations that apply to heavy equipment development.

Robert H. Hose, partner of New York designer Henry Dreyfuss, says "It certainly is not important to have a heavy machine look 'high-style' or cute."

According to Mr. Hose, the major problems are those pertaining to convenience of use, ease of operation, ease of maintenance, safety and cost.

Foreign Tools Lag . . . Sales of European machine tools for export seem to be getting a bit more difficult. Recent trade fairs at Hanover, Vienna, Milan and other continental cities indicate that buyers are choosing tools more carefully, and that export orders are less numerous than they were a year ago.

In contrast to the export situation, domestic markets for European builders are holding up quite well. In many cases, domestic sales are taking up all of the slack resulting from dwindling exports.

Most European builders consider trade fair exhibits to be their best sales medium.

HEAVY EXTRUDED SHAPE

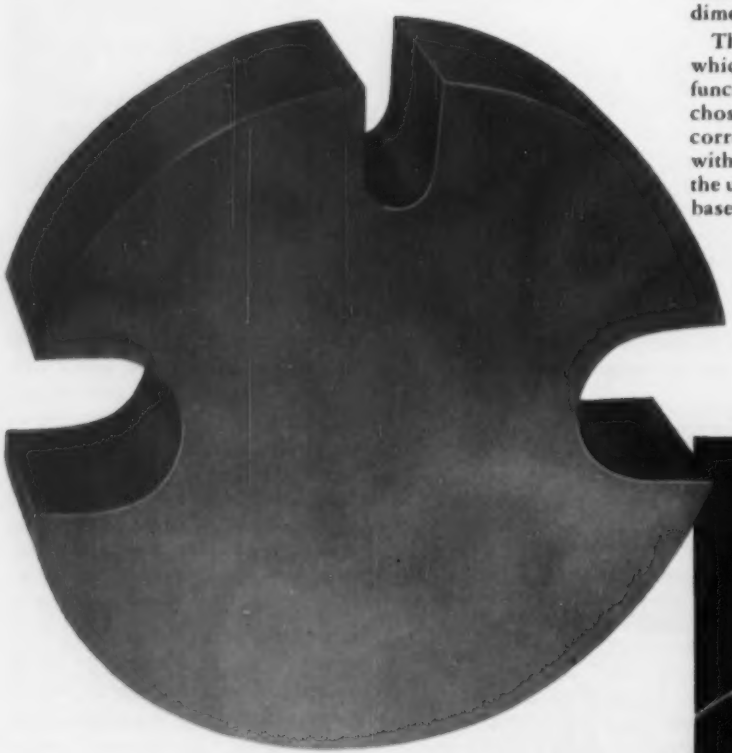
Saves Over 25¢ per lb.

FOR THE STRONG ELECTRIC CORP.

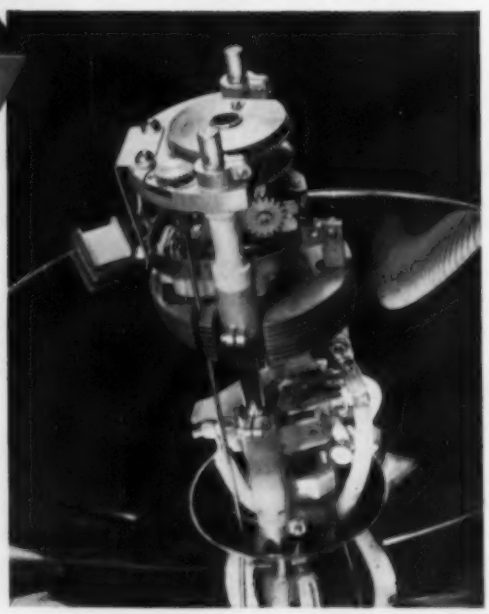
The unusual thing about this copper extruded shape is that it saves money in first cost as well as in machining time. The double economy amounts to over 25¢ per pound. The large illustration shows the shape as supplied in the form of a slug or pre-formed disc, 1 3/16" x 5". This begins as a long extrusion, from which Revere cuts the discs, and pickles them before shipping.

The customer is The Strong Electric Corp., Toledo 2, Ohio, which originally tried plate and bar, but found costs were too high. Revere Product Engineers, Methods and Production Departments collaborated with the company on the problem, and were able to develop the unusually heavy and economical shape. Strong reports a number of savings. One is that the shape is machined quickly and perfectly, with almost no rejects. This is due to the denseness and uniformity of the metal, a result of the high pressures exerted during extrusion. (Finishing operations include drilling bolt holes and cutting cooling fins.) As a secondary result of improved machining, the customer does not have to keep large inventories of metal to take care of spoilage, nor handle large quantities of scrap. Further, Revere supplies the discs in the correct thickness, eliminating a cutting-off operation for Strong. Incidentally, we are glad to supply shapes cut to dimensions, or in long lengths, as desired.

The completed part is an obturator-probe, which fulfills a control and heat dissipation function in a powerful searchlight. Copper was chosen for its ability to conduct heat and resist corrosion. Revere will be glad to collaborate with you in your search for economies through the use of extruded shapes in copper and copper-base alloys, and aluminum alloys.



Copper Extruded Shape, 1 3/16" x 5", as furnished.



Shape in place in a carbon arc searchlight mechanism.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, N. Y.

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Mills: Baltimore, Md.; Brooklyn, N. Y.; Chicago, Clinton and Joliet, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Newport, Ark.; Rome, N. Y. Sales Offices in Principal Cities, Distributors Everywhere.

The Iron Age SALUTES

Tinius Olsen, II **Alert to future needs and ready to try new ways, he has pushed electronic applications in the field of industrial testing. He is a quiet leader with original ideas, persistence and drive.**

At the end of World War II, Tinius Olsen Testing Machine Co. was moving along nicely. Olsen testing and balancing models had made a fine showing in wartime production. The company could offer equipment proven and accepted over the long haul.

The temptation to stand pat must have been strong. But Tinius Olsen, II, had other ideas. Vice president of the company at the time, he realized that American industry was due to break out in a rash of production shortcuts. He felt radically new testing concepts would be needed to keep pace with other developments.

Mr. Olsen had long been fascinated by the idea of putting electric tubes to work in testing and balancing equipment. When the end of the war took the lid off development, he pushed a research program along these lines. Results didn't pour out overnight. It was a long pull but the company finally came up with an electronic null-balance indicating system that eliminated mechanical weighing of a test specimen under load. The principle was applied to balancing equipment as well and led to development of electronic static-dynamic balancing machines. The company feels that research effort and expense have been fully repaid by the speed, versatility and precision of new equipment.

Final recognition of Mr. Olsen's judgment and ability came this year when he was named company president. His father and grandfather before him were leaders in the industrial testing field. He is a successful man who had to measure up to tall standards of success.

When you first meet him, Mr. Olsen gives the impression of shyness. He is unassuming and quiet but emerges gradually as a rich, well-rounded personality. His broad interests include tennis, softball and ping-pong. Recently he ran a sports car rally for a local civic club. The event took place during hurricane Hilda, and all his executive talents were brought into play keeping things moving.

Mr. Olsen is vice-chairman of the Philadelphia District Council of ASTM; president of the Hatboro (Pa.) Rotary; and a member of the Norwegian-American Technological Society.

TIMKEN® bearings on the axles take shock loads of 110-ton ore car

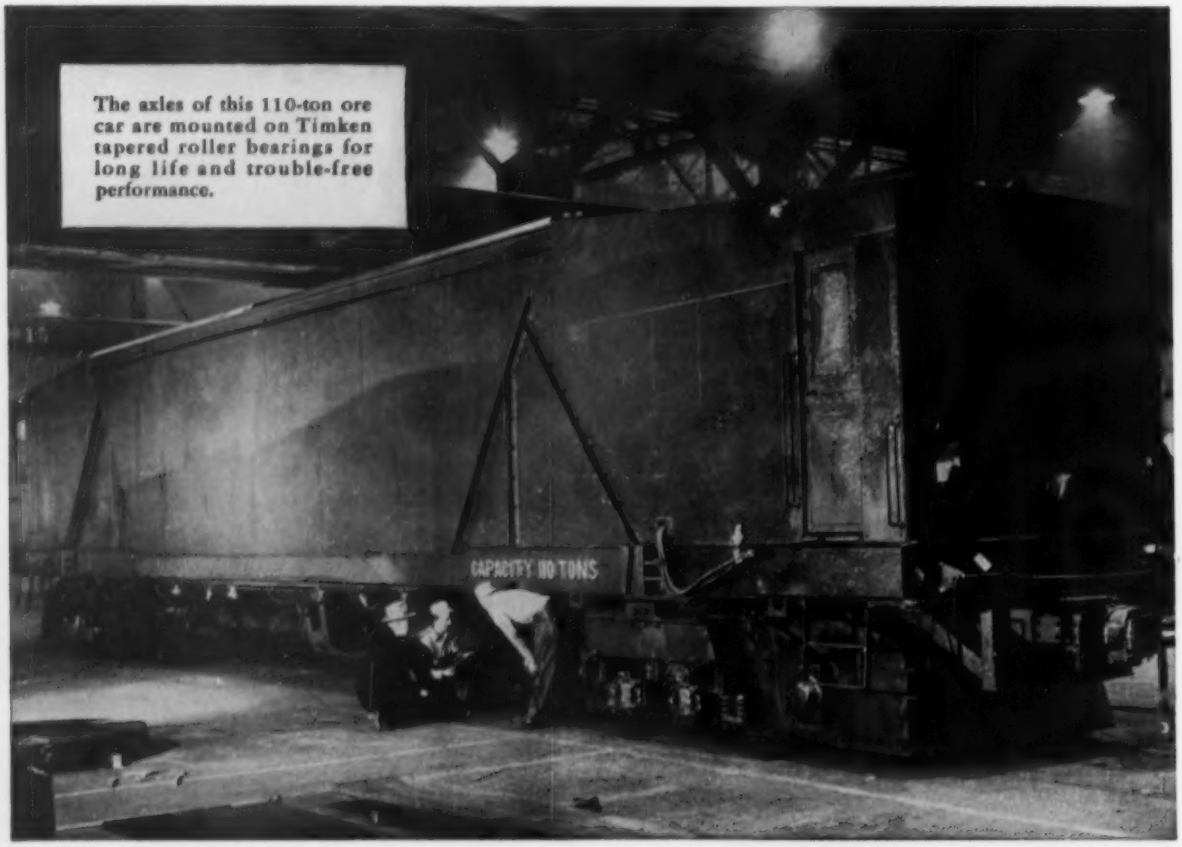
WHEN 110 tons of iron ore are dumped into the ore car pictured below, heavy shock loads hit the bearings on the axles. And when the car bounces over rough track, the bearings have to take repeated shock loads. That's one of the main reasons Timken® tapered roller bearings are used on the axles of this ore car and others like it in a large eastern steel mill.

Timken bearings easily take heavy shock loads because they are case-hardened so that they have tough, shock-resistant cores under hard, wear-resistant surfaces. They take the heavy pounding an ore car gets with minimum time-out for maintenance and repair. And because of full line contact between rollers and races, Timken bearings have extra load-carrying capacity.

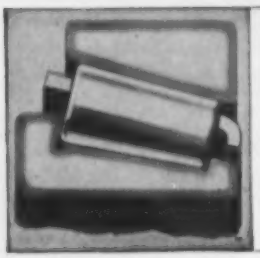
It's easy to start an ore car with Timken bearings on the axles. Timken bearings cut starting resistance 88%. That's because their true rolling motion and smooth surface finish practically eliminate friction.

And since Timken bearings are tapered, they take any combination of radial and thrust loads without the need for costly auxiliary thrust bearings. So whether you're building or buying mill equipment, make sure you get all the advantages only Timken bearings can give. For longer life, less friction, minimum maintenance, always look for the trade-mark "Timken" stamped on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



The axles of this 110-ton ore car are mounted on Timken tapered roller bearings for long life and trouble-free performance.



HARD ON THE OUTSIDE, TOUGH ON THE INSIDE

Rollers and races of Timken bearings are case-carburized to give a hard, wear-resisting surface and a tough, shock-resisting core. Result: longer bearing life.

The Timken Company leads in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis Timken steels.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

The Iron Age INTRODUCES

Harvey T. Harrod, appointed manager, **Westinghouse Electronic Tube Div.,** Elmira, N. Y.; **Edward O. Edney, Jr.,** appointed project manager, Steam Div., South Philadelphia.

Dr. Jack S. Newcomer, appointed research supervisor, **Hooker Electrochemical Co.,** Niagara Falls, N. Y.

Robert Berg, named chief draftsman, **E. W. Bliss Co.,** Canton, O.; **George Bearer** and **Roger Kilpatrick,** named sales engineers, Rolling Mill Div.

J. Carl Brigance, appointed district manager, Chicago sales region, Airtemp Div., **Chrysler Corp.**

J. W. Stack, appointed advertising manager, AC Spark Plug Div., **GMC,** Flint, Mich.; **Frank E. Ray,** named marketing analysis manager; **H. L. Wardrop,** named merchandising co - ordinator; **James P. Kane,** fuel pump merchandising manager; **Donald A. Maize,** named assistant regional manager; **Jack Church,** named spark plug merchandising manager.

Paul S. Mirabito, named general manager, Defense Contracts Organization, **Burroughs Corp.,** Detroit.

Charles D. Olsson, appointed assistant district manager, **Aluminum Co. of America,** Dallas; **William R. Butler,** manager, die casting sales, New York; **Charles Braglio,** appointed manager, jobbing sales, New Kensington; **Warren Van R. Gilbert,** appointed assistant manager, forging sales, Vernon, Calif.

George J. Zachariah, appointed purchasing manager, **Cosden Petroleum Corp.,** Big Spring, Texas.

Richard J. Bambery, appointed sales manager, freezer-air conditioner div., **Admiral Corp.,** Memphis.

Maurice K. Brown, appointed assistant general sales manager, **Penn Metal Co., Inc.,** Los Angeles.

Donald R. Goetchius, appointed manager, Ceramic Sales, Frit and Glaze Div., **Ferro Corp.,** Cleveland.

Jack L. Ziercher, appointed manager, Market Research, **Harbison-Walker Refractories Co.,** Pittsburgh.

Kenneth D. Reed, appointed manager, Lubrication Section, **Dravo Corp. Machinery Div.,** Pittsburgh.

W. R. HEATH, elected executive vice-president, Buffalo Forge Co., Buffalo.

ROBERT C. HOUSER, elected treasurer, H. K. Porter Co., Pittsburgh.

EDWARD J. FERRIS, elected general superintendent, Machine Tool Div., Pratt & Whitney Co., West Hartford, Conn.

PAUL N. STANTON, appointed assistant sales manager, The Lapointe Machine Tool Co., Hudson, Mass.

Don't junk your old boring mill just because it has grown wobbly and loose. Now is the time to have your outdated machine tools returned to their original performance levels through Simmons Engineered Rebuilding—at half the cost of new equipment

Engineered Rebuilding by Simmons *unconditionally guarantees* that your machine tools will equal or exceed manufacturers' original specifications.

And, through modernization, Simmons is adapting old machines to high-speed, high-precision production that was unheard of when the tools were new.

Today: look into the important economies in production, maintenance, and liberal tax allowances available when you turn the old machines in your plant into precision equipment for today's production!

Write, wire, or phone...

Simmons Machine Tool Corp.
1721 N. Broadway, Albany 1, N. Y.

Unconditional guarantee...
our standard since 1910

Frank McLain, appointed assistant sales manager, Detroit Tube & Steel Div., **Sharon Steel Corp.,** Detroit; **David Campbell, Jr.,** named sales representative, Detroit Tube & Steel Div.

Donald J. Shaughnessy and **Daniel Neuman,** named assistant managers, Production Planning, **Pittsburgh Steel Co.,** Pittsburgh; **John L. Jones,** appointed staff assistant, Production Planning.

R. S. Allison, appointed assistant plant manager, **Consolidated Chemical Industries Inc.,** Woburn, Mass; **A. L. Stephenson,** elected assistant plant manager, Bayshore, Calif.; **C. E. Spear,** appointed director of development, Pacific & New England Div., San Francisco.

James A. Turnipseed, Jr., named abrasive engineer, **Bay State Abrasive Products Co.,** Southern area.

William J. Pierre, named director of purchases, **Kaydon Engineering Corp.,** Muskegon, Mich.; **Harold R. Marquand,** appointed director, industrial relations; **Harry C. Waters,** appointed assistant treasurer.

John A. Petroskas, named chief metallurgist, **Phoenix Iron & Steel Co.,** Phoenixville, Pa.

Jack C. Thomas, named district representative, Northern Ohio, **The W. W. Sly Manufacturing Co.,** Cleveland.

C. Walter Beattie, named supervising metallurgist, research laboratories, **Armco Steel Corp.,** Middletown, O.; **Arthur M. Johnsen,** named supervising metallurgist.

Robert M. Dryer, named chief geologist, Exploration Dept., **Kaiser Aluminum & Chemical Corp.,** Oakland, Calif.

ROBERT HARTENSTEIN, appointed chief engineer, Mannesmann-Meer Engineering and Construction Co., Easton, Pa.

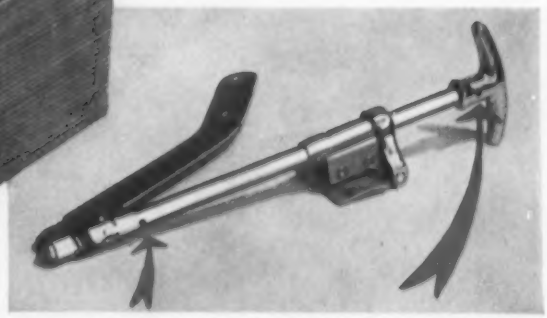
E. B. FITZGERALD, appointed division manager, mill and heavy industry, Cutler-Hammer Inc., Milwaukee.

PERRY C. SMITH, appointed manager, Equipment Dept., Brush Electronics Co., Cleveland.

R. A. FERGUSON, appointed sales manager, Special Products Div., Latrobe Steel Co., Latrobe, Pa.

3 Better Methods with ROLLPIN

TO REPLACE A RIVET Rollpin's spring action firmly fastened radio transformer laminations in place and did two things a rivet couldn't do—aligned the laminations and compensated for minor hole variations.



TO REPLACE A STOP PIN Rollpin's self-locking action eliminated staking or peening operations required to retain a straight solid pin.

TO REPLACE A SET SCREW on automobile brake handle, Rollpin is self-retained in the hand grip but can easily be driven into overdrilled hole in shaft to free handle, then removed and used again.

TO REPLACE A DRIVING PIN for a flexible drive shaft on a washing machine, Rollpin cut assembly costs by eliminating precision drilling and reaming

Where can you use this simple fastener?

If you use locating dowels, hinge pins, rivets, set screws —or straight, knurled, tapered or cotter type pins, Rollpin offers the opportunity of a better method that can cut assembly and maintenance costs. This slotted tubular steel pin with chamfered ends eliminates special machining, tapping, and the need for precision tolerances. Driven into a hole drilled to normal production standards, it locks securely in place, yet can readily be drifted out and reused whenever necessary.

ESNA

ELASTIC STOP NUT CORPORATION OF AMERICA

ROLLPIN TRADEMARK

MAIL COUPON FOR DESIGN INFORMATION

Elastic Stop Nut Corporation of America
Dept. R37-1077, 2330 Vauxhall Road, Union, N. J.

Please send the following free fastener information:

- ☐ Rollpin samples
- ☐ Rollpin bulletin
- ☐ Here is a drawing of our product. What self-locking fastener would you suggest?

Name _____ Title _____

Firm _____

Street _____

City _____ Zone ____ State _____

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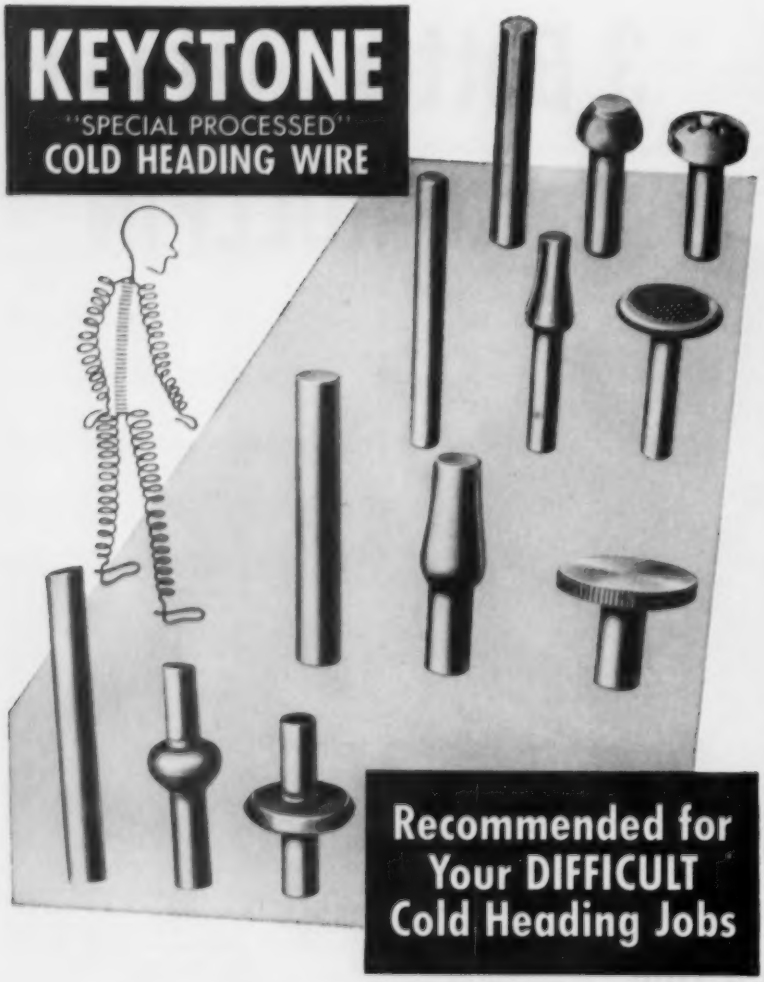
"SPECIAL PROCESSED"
COLD HEADING WIRE



Recommended for Your DIFFICULT Cold Heading Jobs

When you have "tough-to-make" cold heading jobs on your production schedule, it will pay you to consider the outstanding advantages offered by Keystone "Special Processed" Wire.

The superior grain flow characteristics of this wire provides the necessary upsetting and die forming qualities to withstand the terrific displacement of metal during the most difficult cold heading process. The structural soundness and uniformity of "Special Processed" Wire further proves itself through trouble-free machine operation, longer die life, and finished products of the highest quality.

If you have a special wire problem . . . large or small . . . let us help you solve it. Contact your Keystone representative or write.

Keystone Steel & Wire Company
Peoria 7, Illinois
Industrial Wire Specialists

Russell L. Hill, named field engineer, **The Warner & Swasey Co.,** Philadelphia; **Edward Shipler,** named field engineer, East Orange, N. J.

Mel Corneliuson and **Ronald Davis,** appointed field engineers, **Rezolin, Inc.,** New York; **Robert Johnson,** appointed field engineer, Detroit; **Bill Cornner,** named field engineer, Los Angeles.

H. A. Bartling, named assistant director, electrical engineering, **Allis - Chalmers Manufacturing Co.,** Milwaukee; **W. E. Gutzwiller,** appointed manager, electronics section; **D. B. Scott,** named assistant manager, electronics section.

Frederic C. Faulkner, named sales representative, Steel Strapping Div., **The Stanley Works,** New Britain, Conn.; **Milton T. Craig,** named sales representative, Steel Strapping Div., Rhode Island & Massachusetts.

John J. Forst, named sales representative, Roll Bond, **Olin Mathieson Chemical Corp.,** Detroit; **R. E. Bockhorst,** named sales representative, Roll Bond, Dayton; **H. F. Devens,** appointed sales manager, Roll Bond, Metals Div., New York.

G. P. Schivley, appointed director of manufacturing, **Buffalo Forge Co.,** Buffalo.

J. J. Plumb, named purchasing agent, Machine & Tool Div., **Michigan Tool Co.,** Detroit; **Milton C. Ton,** named purchasing agent, Cone-Drive Div., Traverse City, Mich.; **Duncan E. Vertrees, Jr.,** appointed service manager, Machine & Tool Div., Detroit.

William M. Robertson, appointed sales representative, **Calumet & Hecla, Inc.,** New York; **F. F. Moore,** elected assistant district sales manager, Wolverine Tube.

4140 steel is your best bet for light and heavy sections
AISI—SAE 4140
C 0.38/0.43
Mn 0.75/1.00
Pmax 0.040
Smax 0.040
Si 0.20/0.35
Cr 0.80/1.10
Mo 0.15/0.25
4100 steels are your best bet
Chromium Molybdenum Steel like AISI-SAE 4140 is doing a job economically in both light and heavy sections. Whether in the equipment that drills an oil well — or bolts for a thousand uses, *plentiful* 4100 Moly steel does a better job. We can show you how.
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cut with confidence . . . **HERE'S THE**

New LeBlond Dual Drive Lathe

NEW LeBLOND DUAL DRIVE

best buy for medium duty turning

More than ever before, LeBlond's new 15″ Dual Drive lathe gives you efficient capacity at low cost for the great proportion of your lathe work.

With a single lever, the operator commands a smooth and powerful range of 16 spindle speeds from 31 to 2400 rpm. The proven combination gear-belt drive headstock provides twelve gear-driven low and intermediate speeds; 4 high speeds are driven through a positive Gilmer-type belt that requires no adjustment. The 5 hp motor is ample for all work up to that which requires the power of a heavy duty.

The new bed is rigidly ribbed and is fitted with hardened and ground replaceable steel inserts according to LeBlond's compensating veeway principle for better distribution of cutting forces. Chip pan slides in grooves, is easy to clean out. Precision under load is assured by one-piece apron design and long carriage wings with plenty of bearing. Quick-change box is totally enclosed. The tailstock is the same rugged offset-handwheel type used on all LeBlond heavy duties.

All in all, you'll find the new Dual Drive a very fine, yet moderately-priced machine that will take good care of all but the most unusual requirements. See your nearby LeBlond Distributor or write for Bulletin 6C.

. . . cut with confidence

THE R. K. LEBLOND MACHINE TOOL COMPANY
CINCINNATI 8, OHIO

LeBLOND *of Cincinnati*

WORLD'S LARGEST BUILDER OF A COMPLETE LINE OF LATHES • *FOR MORE THAN 68 YEARS*

Heavyweight TV wrestler fails to flake Inland TI-CO®

Well-known television wrestler, **Zack "Old Ironsides" Malkov,** *one of the roughest, strongest "grunt and groaners" in the business, puts his full 235 pounds behind a 10 lb. sledge hammer in an attempt to break the zinc coating on a sheet of Inland* TI-CO *Galvanized Steel.* TI-CO *rolled with the punch, the sheet gave but the coating stayed put!*

Not many applications require the coating on TI-CO to take the punishment of repeated blows by the business end of a sledge hammer! We think this unusual demonstration does illustrate, however, the ability of TI-CO to take even the toughest fabricating operations . . . stamping, drawing, crimping, double-seaming, brake forming or even spin drawing . . . without cracking or flaking of the zinc coating.

TI-CO's secret is in the patented Sendzimir process which produces a galvanized sheet with a tightly adhering zinc coating that flows with the base metal as it is being fabricated. This flexible, uniform coating means that products made with TI-CO are easier and cheaper to produce because re-dipping after forming is eliminated. And they stay serviceable and good-looking longer.

It will pay you to specify Inland TI-CO for all your galvanized steel requirements.

INLAND TI-CO . . . with the zinc coating that rolls with the punch.

Close-up of TI-CO *after sledge hammer test. Shows severity of strain on sheet and complete absence of cracking or flaking of the zinc coating.*

WANT MORE FACTS? *Write for our new* TI-CO *catalog. It's a word-and-picture story of* TI-CO *in action.*

INLAND TI-CO

INLAND STEEL COMPANY

38 South Dearborn Street • Chicago 3, Illinois

Sales Offices: Chicago, Milwaukee, St. Paul, St. Louis, Davenport, Kansas City, Indianapolis, Detroit and New York

The Iron Age
FOUNDED 1855
TECHNICAL ARTICLES

Combines arc and vacuum—

Melting Process Offers Higher Quality Superalloys

◆ A new development in melting superalloys marks another advance in the fast-growing field of vacuum metallurgy . . . These highly important materials are now being arc melted under vacuum, using consumable electrodes.

◆ Results obtained for the method are impressive . . . They include: ingots up to 2000 lb, improved metal cleanliness, lower gas content and close control of solidification rates . . . The promise showed by the process justifies plans to produce 5000-lb ingots in the near future.

BY W. W. DYRKACZ
Associate Director of Research,
Allegheny Ludlum Steel Corp., Watervliet, N. Y.

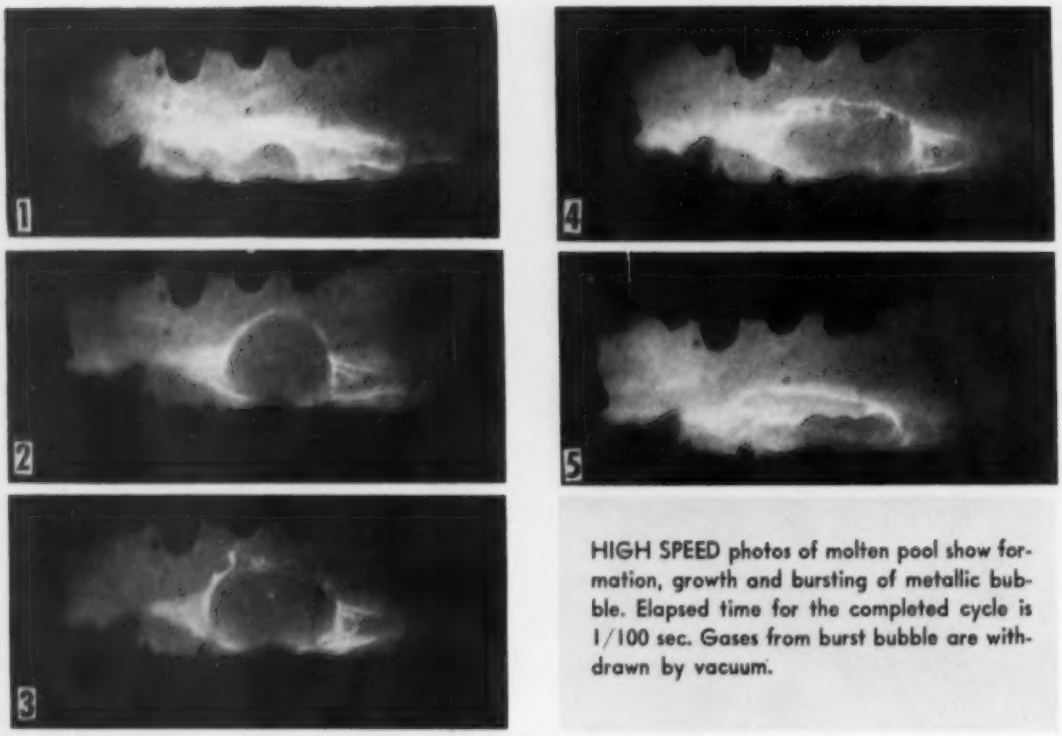
◆ MUCH-NEEDED SUPERALLOYS are now being arc-welded under vacuum, using alloyed consumable electrodes of predetermined composition.

Results obtained by the process are impressive. Among them, count 1) ingots up to 2000 lb, 2) improved metal cleanliness and lower inclusion count, 3) lower gas content, and 4) freedom from segregation gained by closer control of solidification rates.

The consumable electrode approach to vacuum metallurgy has proven successful in the production of nickel- and iron-base superalloys as well as other stainless steels. Modifications of the general process required by the special needs of superalloys are the development of Allegheny Ludlum's research laboratory at Watervliet, N. Y.

Economic aspects of the process are still in the figuring stage. More experience is needed before valid comparisons can be made with induction melting techniques.

Basically, the procedure consists of making cast electrodes of an alloyed, predetermined composition from a production-size, electric furnace air melt. These electrodes are then remelted



HIGH SPEED photos of molten pool show formation, growth and bursting of metallic bubble. Elapsed time for the completed cycle is 1/100 sec. Gases from burst bubble are withdrawn by vacuum.

under vacuum by arc melting in a water-cooled, copper crucible. To date, vacuum melted ingots up to 12 in. diam and weighing 1000 lb have been made from nickel-base superalloys. Even larger ingots (16 in. diam—2000 lb) have been made in the iron-base superalloys.

So far the process has been used to melt more than 300,000 lb of alloy. The melting of certain materials has definitely graduated from the development to the production stage. The method is promising enough to justify current plans to produce 5000 lb ingots in the very near future.

This promise stems directly from the advantages claimed. Degasification, for example, is one important advantage resulting from vacuum remelting by the consumable electrode process. Evidence is produced in Fig. 1—a series of frames from high speed motion pictures taken of the melting process in action.

These photos of the molten pool trace the formation and growth of a metallic bubble. The bubble contains gases which expand because of the high temperature. Finally the pressure becomes sufficiently high to burst the bubble. As the pierced bubble subsides to the molten bath, the gases are withdrawn by the vacuum.

Elapsed time for the completed cycle is about 1/100 of a second. While this type of degasification proceeds continuously in the molten bath, gases are also withdrawn from smaller metal droplets on transfer from the electrode to the molten pool. This phenomenon occurs where high ratio of surface area to volume permits easy withdrawal of the gases without bubble formation. On remelting, air-melted electrodes, it is possible to remove 65 to 95 pct of hydrogen, oxygen, and nitrogen.

As far as degasification is concerned, results are about on a par with those obtained by induction vacuum melting. This was determined by gas analyses run on such alloys as M-252, Waspaloy, and A-286.

But the process' claims for improved metal cleanliness are distinct since they tie in directly with the mechanics of arc melting. For one, arc temperatures are on the order of 8500°F. This is more than three times the temperatures normally used in induction vacuum melting.

Under the extremely high temperatures and low pressures, less stable oxides and other compounds tend to dissociate. More stable compounds, such as titanium nitrides, float to the top because their specific gravity is lower than that of the parent metal. Thus arc vacuum melting provides two means for eliminating unwanted inclusions.

Nominal Composition of Superalloys

Alloy	C	Cr	Ni	Co	Mo	Ti	Al	V	Fe
M-252	0.15	20.0	Bal	10.0	10.0	2.5	1.0	—	5.0 max
Waspaloy	0.05	20.0	Bal	13.5	4.0	2.5	1.3	—	2.0 max
A-286	0.05	15.0	25.5	—	1.3	2.0	0.2	0.3	Bal

Fig. 2 illustrates the cleanliness achieved with bars of A-286. The same significant improvement in cleanliness has been duplicated in the nickel-base, titanium-hardened alloys such as M-252 and Waspaloy, and titanium-containing stainless grade 321. Low alloy and high speed grades responded in the same way.

Improve workability

Freedom from such stringers and other inclusions results in significant improvement in the workability of the materials during hot or cold working. Improvement in hot workability is shown in Fig. 3. Air-melted material containing stringers tends to crack at the outer surfaces on drastic upsetting. The consumable electrode melted material does not rupture.

This melting method also goes a long way toward generally improving tensile properties. In such applications as gas turbine wheels, high tensile ductility is required at the center of the part. Ductility is directly related to the cleanliness and segregation in the center of the large billet sections from which these parts are made.

In turbine wheel materials, such as A-286, it has been found that center ductility decreases with increasing amounts of segregation. Segregation in conventionally solidified ingots is more severe in the top third portion of the ingot. As a result, the top portion of a finished billet is often unsatisfactory for critical applications.

This segregation is minimized, if not entirely eliminated, by consumable electrode melting. It makes possible fast cooling and control of solidification rates in a cold mold. Thus strategic alloy can be saved and productivity increased.

A comparison of transverse room temperature tensile ductility in A-286 produced by conventional and consumable electrode melting showed a marked difference between the two. Consumable electrode melted material provided a 21 pct elongation as against about 9 pct for the conventional melt.

Hot tensile ductility and stress rupture properties are also improved, according to tests made on M-252 alloy. At 1500°F, rupture elongation is upped from about 16 pct to about 30 pct. Stress-rupture elongation jumps from about 11 pct to almost 30 pct. In addition, a 15 pct improvement in the 1500°F fatigue strength has also been reported.

Similar improvements in hot fatigue strength are indicated by data on the A-286 alloy. The endurance limit at 1200°F of air-melted A-286 varies from 37-45,000 psi. Consumable electrode melted A-286 shows an endurance limit of 47,000 psi. Further increase of this limit to above 55,000 psi is obtained by raising the titanium content above the A-286 specification and modifying the heat treatment. The higher titanium A-286 composition would be most difficult to produce on a commercial basis from air-melted ingots because of hot workability and other segregation problems.

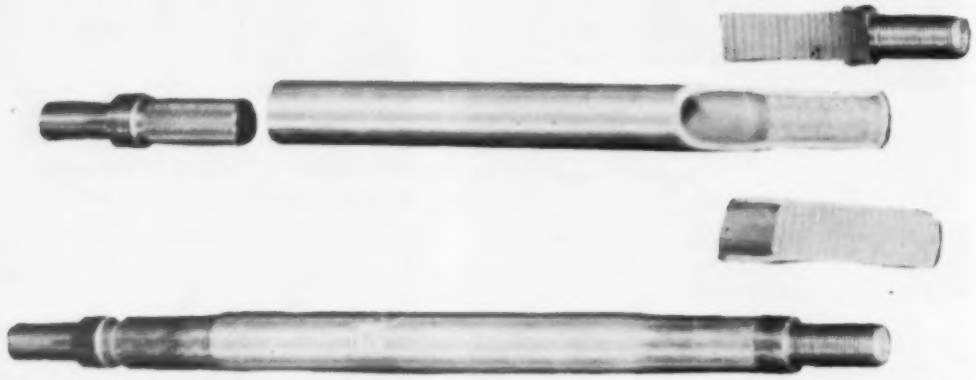
The study indicates that consumable electrode remelted superalloys compare favorably with induction vacuum melted material from a quality standpoint. The process can produce large size ingots with a minimum amount of segregation. Both of these features may prove extremely important in future jet engine applications as turbine wheel temperatures are increased. These more critical conditions will call for new turbine wheel materials which may be even more susceptible to center segregations.

The process does have some disadvantages. One is that the pool during melting stays molten for a relatively short period of time. This tends to limit the time allowed for degasification.

Factors which tend to counterbalance this are the higher temperatures involved and the fact that meling in a cold metal mold eliminates contamination by refractory materials to which an induction vacuum is exposed. Also, progressive melting and vertical solidification afford the chance to float exogenous inclusions due to their lower specific gravity.

A further refinement of the present process has been scheduled for future test. This will involve casting electrodes from an induction vacuum melt and then remelting under vacuum by the consumable electrode process. An extension of types of alloys is also planned.

AIR-MELTED A-286 material containing stringers tends to crack at outer surface on drastic upsetting. Consumable electrode A-286 material, bottom, did not rupture, showed better hot workability.



TUBE ends are swaged to knurled and threaded end fittings to form this push-pull rod.

Use fewer components—

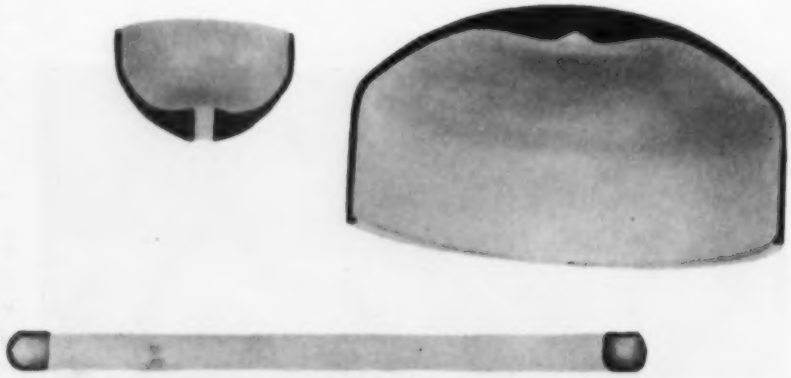
Tube-Forming Techniques Simplify Structural Assemblies

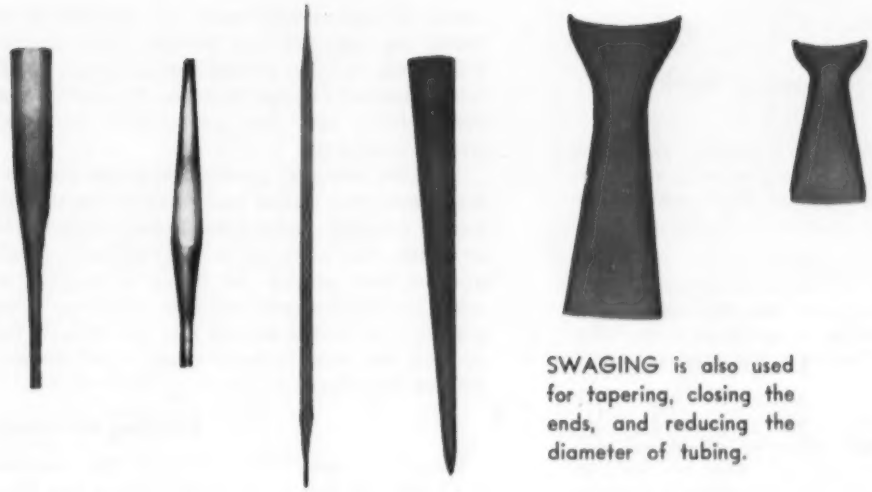
◆ Round, thin-walled metal tubing is excellent for building strong, lightweight structures . . . But the problem of attaching tube ends to other structural parts often restricts ideal tubular designs.

◆ Airframe manufacturers lick these problems by a number of tube-forming and attaching techniques . . . They spin, swage, impact extrude and gather to eliminate inefficient joining methods.

By F. J. PESAK, Senior Design Engineer, North American Aviation, Inc., Los Angeles

HOT spinning closes or thickens the ends of 4130 steel tubes for attaching fittings.





SWAGING is also used for tapering, closing the ends, and reducing the diameter of tubing.

◆ DESIGN AND FABRICATION of tubular details into modern airframes has brought about the use and perfection of several production techniques. However, the use of these methods is not limited to aircraft manufacturing.

Regardless of his specific field, the design engineer who is faced with the problem of producing rigid, lightweight structures and components prefers the use of tubing wherever it is applicable. But because of the inherent problem of attaching thin-walled tubing to other components, the design engineer frequently must make certain concessions in order to use tubular material.

At times, these concessions involve the use of more, rather than fewer assembly components. Extra work, extra weight and extra expense are often involved.

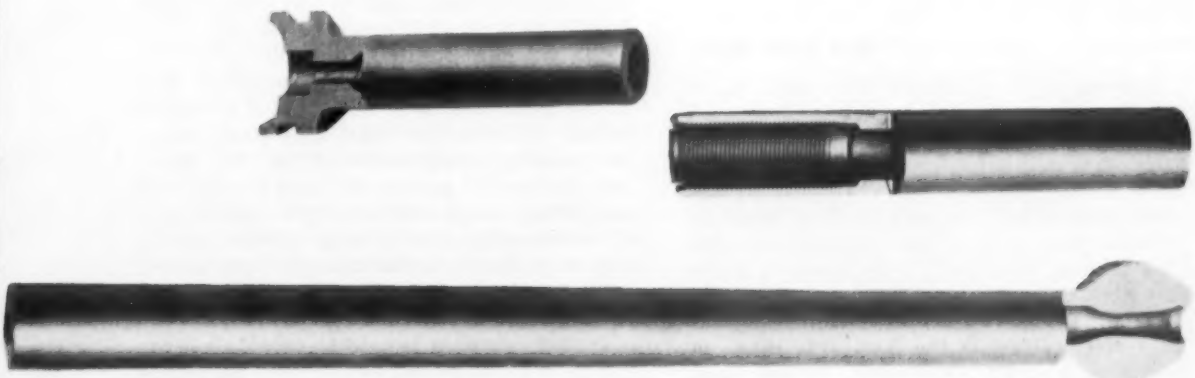
Modern aircraft construction is exceptionally well suited to the use of tubular materials, and airframe manufacturers utilize a number of successful production techniques to fabricate and assemble these products. These methods include spinning, swaging, expanding and bulging, impact extrusion, redrawing, and gathering. The primary design goal always is to reduce substantially the number of details in a given assembly.

Seek one-piece designs

The one piece tubular design is by far the most favorable; in most cases it is also the most economical.

Thus, control rods, struts and other pieces are most efficiently designed around tubular details when column strength and rigidity is mandatory in combination with light weight. In many of these tubing applications, the aforementioned airframe production methods replace either expensive machining, or less efficient fabricating and joining methods.

Metal gathering, as applied to form a one



GATHERING, forging and finish machining produce intricate details on ends of steel tubing.

Where to Apply These Tube-Forming Methods

GATHERING

To "bunch" metal at the ends or at points along the length of a tubular section. Extra metal thus provided can be used for supplementary forging, or internal or external machining.

SWAGING

Used to taper or form wall configurations in tubing, also to close the ends. Will reduce outer diameter of tubing to precision limits. Also used to imbed tube ends into knurled sections of end fittings.

SPINNING

Done hot or cold, depending on the raw material, this technique will close the ends of tubing and increase the wall thickness at these points to receive end fittings.

IMPACT EXTRUSION

Will put a heavy flange on the end of a thin-walled tube when simple leakproff joints are required. Extruded shapes can later be bent, swaged or spun for final details of design.

piece control rod, typifies this new approach to an old problem. Steel tubing as light as 0.035 in. in wall thickness is gathered at one or both ends. This bulks enough of the tube body to permit internal or external threading, or even the forging of integral end fittings. One piece rods formed in this manner are extremely desirable in critical areas where strength and rigidity must be maintained, but without extra weight.

The one piece tubular components produced by gathering and other forming methods have many physical advantages. Grain flow structure is excellent and no metal is lost by being machined away. And with proper control of the forming process, original tubing wall thickness and outside diameter can be tapered or shaped to other desirable configurations.

Spin many forms

Tube spinning offers excellent examples of how process control can produce a variety of wall forms. This technique has only recently achieved significant success, and it can be applied to most metals either at room or at elevated temperatures. As with the draw bench or swaging techniques of tube forming, the spinning process produces a most adequate grain flow structure.

Hot spinning is commonly applied to low alloy steel tubing in the SAE 4130 range in producing aircraft components. In one case, high pressure containers are made by spinning end closures on both ends of a tube. Spinning can also build up the wall thickness of tube-end areas so that enough metal is available to receive the required end fittings. This method eliminates the need for the comparatively costly hemispherical shapes produced by punch press draw dies; also the subsequent half-shell welded assembly.

In other everyday production areas, airframe manufacturers utilize many variations of well known swaging techniques. Rotary swagers, or swaging dies adapted to conventional punch presses, both permit the sizing or shaping of solid or tubular material into precision components. Malleable metals may be swaged hot or cold, but certain restrictions apply to heat treated materials.

Swaging cuts costs

Swaging is applied to many of the stainless AISI 300 and 400 series steels and to low alloy steels in the SAE 4130 group; also to titanium, Inconel and many other alloys. Heat treated alloys of aluminum as well as those of low alloy steel (up to 100,000 psi tensile strength) may be reduced approximately 15 pct by this method.

There are some restrictions as to the amount of swaging possible in one pass with annealed aluminum or steel alloys. Interstage annealing permits final reductions equal to those possible with low carbon steel or other more malleable metals.

Some of the most common swaging advantages include tapering, various other form transitions, and sizing both tube diameters to closer tolerances than those produced by standard tube mill operations. And there are still other, more unique production methods based on the swaging process. These use combinations such as redrawing, machining, nosing and expanding. They permit economical fabrication of details which, in some cases, would be impossible or otherwise impractical to make by any other known method.

Typical examples are long tubular sections that have a constant outer diameter, but which also have several heavy wall section areas within the tube length. Such components are advantageous where light weight must be combined with strength in specific locations.

The swaging of tube ends to knurled end fittings is still another production technique. This is commonly done with heat treated aluminum tubing or normalized SAE 4130 steel tubing. The swaging operation imbeds the tube metal into the knurled portion of a heat treated steel end fitting, thus providing a solid joint capable of withstanding the ultimate strength of the tube itself. Stainless steel tubing is being swaged to end fittings of the same material by this technique on an experimental basis.

Impact extrusion is used to provide a heavy flange on a thin-walled section, thus permitting easy, leakproof attachment to other components. Reductions up to 90 pct and length-to-diameter ratios of 15:1 are common.

PART I

By **A. M. SABROFF,**
Project Leader,
W. M. PARRIS,
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Columbus, O.

Titanium Extrusion A New Fabricating Technique

Broadens applications—

- Successful extrusion of titanium greatly extends the metal's usefulness to industry . . . It helps cut costs by conserving expensive material and eliminating difficult machining.

- Titanium extrusion—as a process—was developed from systematic, painstaking research . . . A major titanium extrusion program now provides authoritative, down-to-earth information on this important development.

◆ THE EXTRUSION process—long in use for aluminum, copper, and other metals—can now be successfully applied to titanium. The need for the development of new fabrication techniques for this metal was underlined by aircraft requirements.

Extrusion has certain distinct advantages in the forming of many structural shapes. But, along with other metal forming techniques, it requires a lot of practical answers to shop problems before it can be made to work successfully.

Principal problems center around the die materials, lubricants, and die designs needed to produce the best surface finish for titanium parts at the extrusion temperatures producing best properties.

Basic information for extruding the metal was developed at Battelle Memorial Institute, Columbus, under the sponsorship of Wright Air Development Center.

Battelle ran its tests on both unalloyed titanium and the Ti-3Mn-complex alloy. The alloy tested contained 3.82 Mn, 1.39 Cr, 1.13 Fe, 1.33 Mo, and 1.29 V. This is about 2 pct more alloy than is called for in the nominal composition.

Test billets weighing approximately 16 lb each were extruded on an 850-ton aluminum extrusion press equipped with a 4⅝ in. diameter container. Maximum press speed was 41 in. per minute under full load. Billets measured 4 7/16 in. in diameter by 6 in. long.

The billets were extruded to 1 in. diameter bars. This corresponds to a 21:1 extrusion ratio or a reduction in area of 95.4 pct.

The press container was heated to 800°F prior to extrusion. Dies and dummy blocks were preheated to temperatures in the range 500°-800°F. Lubricant was applied to both the container and die.

For mechanical testing, specimens were re-

This article is the first of a two-part series on titanium extrusion. A second article on lubricants and die materials will appear in next week's issue.

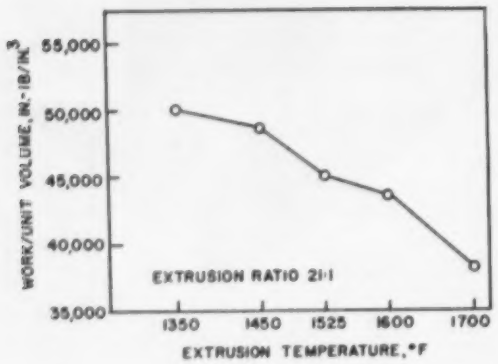


FIG. 1—How temperature affects the work of extrusion for the Ti-3Mn-complex alloy. Note that the work required for extrusion tends gradually to decrease as temperature increases.

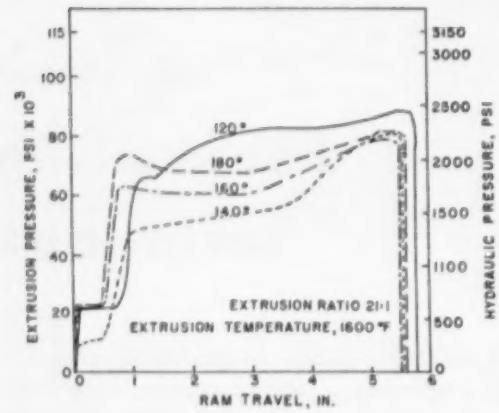


FIG. 2—Pressure vs ram-travel curves for the extrusion of unalloyed titanium through flat-face and conical dies. Work of extrusion for each die angle was calculated from pressures.

moved from the front, middle, and back sections of the extruded bars. Standard 0.505 in. diameter tensile specimens were used throughout. An average of two determinations was made on specimens from different sections of the extruded bar for all tensile properties except yield strength. Vickers hardness measurements were made on polished metallographic specimens.

Extrusion temperature counts

The effect of extrusion temperature was checked on both unalloyed titanium and the Ti-3Mn-complex alloy. Flat-faced dies with a 3/16 in. radius at the die opening and a bearing length of 3/16 in. were used in these tests.

The unalloyed billets were extruded at 1450, 1600, 1750, and 1900°F. In the as-extruded condition, the ultimate tensile strength of these bars decreased from 87,000 to 68,500 psi as the extrusion temperature increased from 1450 to 1900°F. Little difference existed between the properties of the bars extruded in the alpha-phase region at 1450 and 1600°F.

This was also true of the bars extruded in the beta-phase region at 1750 and 1900°F. The marked change in properties occurred between 1600 and 1750°F. Annealing for one hour at 1500°F and air cooling did not produce any significant difference in the mechanical properties of the bars. Minimum elongation in all conditions was 30 pct.

Microstructurally, the bars extruded at 1450 and 1600°F showed a duplex structure of alternate concentric rings of fine and coarse equiaxed alpha grains. This partly recrystallized structure is due to the variations in deformation of the metal from the center to the surface of the bar during extrusion. The bars extruded in the beta-phase region at 1700 and 1900°F were completely recrystallized and showed a uniform structure with only slight flow markings.

The Ti-3Mn-complex alloy was extruded at 1350, 1450, 1525, 1600, and 1700°F. Mechanical properties of the bars extruded at each temperature were determined in each of the following conditions: 1) as extruded, 2-4) solution treated at 1300°F and 2) aged 48 hrs at 800°F, 3) aged 8 hrs at 900°F, and 4) aged 8 hrs at 1100°F. Solution treatment consisted of heating for one hour at temperature and water quenching.

As extruded at 1350°F, the Ti-3Mn-complex alloy has a tensile strength of 183,000 psi, with 10.5 pct elongation in 2 in. Increasing the extrusion temperature to 1450°F increased the strength to 200,000 psi, but lowered the elongation to 3.5 pct. Tensile specimens of the bars

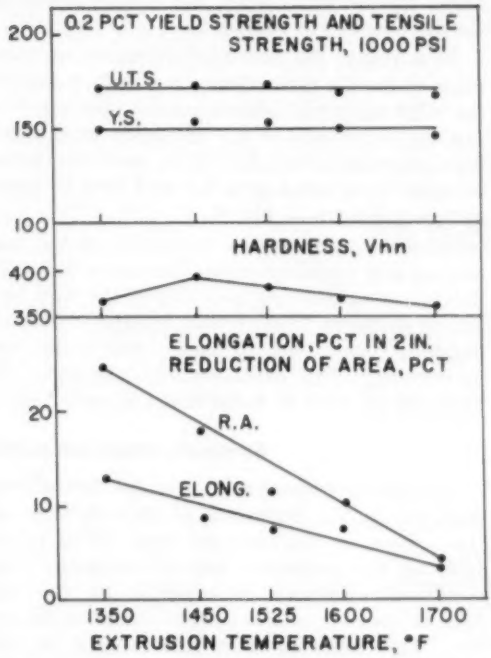


FIG. 3—Extrusion temperature's effect on mechanical properties of Ti-3Mn-complex alloy solution treated (1300°F) and aged 8 hrs at 900°F.

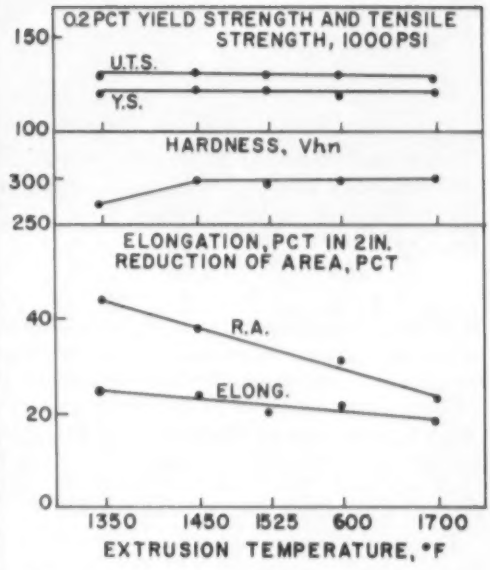


FIG. 4—Effect of extrusion temperature on mechanical properties of Ti-3Mn-complex alloy solution treated (1300°F) and aged 8 hrs at 1100°F.

extruded above 1450°F broke in the threads with a brittle fracture.

Solution treating at 1300°F, followed by overaging at 800, 900, and 1100°F, produced strength levels of 180,000, 170,000, and 130,000 psi, respectively. The elongation and reduction of area values obtained in each of the overaged conditions decreased as the extrusion temperature increased. These effects are shown in Figs. 3 and 4.

Microstructures of the as-extruded bars showed equiaxed beta grains containing alpha

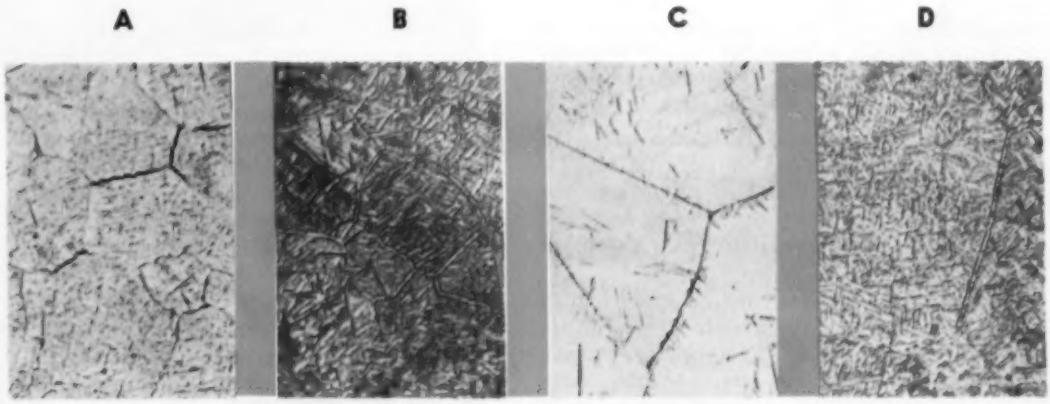


FIG. 5—Microstructures of Ti-3Mn-complex alloy as-extruded at 1350°F (a) and 1700°F (c). Corresponding heat treated structures (b and d) are shown at right. Magnification: 500X

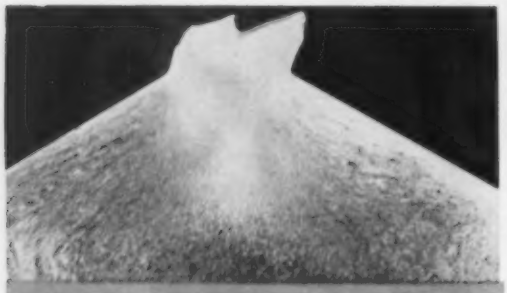


FIG. 6—Etched section of skull of unalloyed Ti billet extruded through 120-degree die shows no signs of undesirable laminations.

in a Widmanstätten pattern. The size of the prior beta grains increased as the extrusion temperature increased. Transformation to an all-beta structure, even at the lower extrusion temperatures, was attributed to heat generated during extrusion and a higher alloy content than nominal. The latter lowered the beta transus from about 1550°F to about 1450°F.

The embrittlement occurring above 1450°F is believed to be associated with the increase in beta-grain size and some instability of the beta phase which resulted in hardening during cooling.

Structures Analyzed

Photomicrographs of bars extruded at 1350 and 1700°F are shown in Fig. 5. They show the typical structures in the as-extruded and the solution-treated and aged conditions. Microstructures of all of the extruded alloy bars are undesirable. The optimum structure for alpha-beta alloys consists of random spheroidal alpha particles in a fine-grained beta matrix.

The equiaxed, prior beta grains with massive grain-boundary alpha seen in the extruded bars generally reduce ductility. At higher strength levels, this combination results in complete embrittlement. The good ductility obtained in the bars extruded at 1350 and 1450°F and heat treated was probably associated with their relatively small grain size.

The effect of temperature on the extrusion pressure was determined in tests on the Ti-3Mn-complex alloy. Work of extrusion was calculated from the pressure curves by graphical integration and relationships are shown in Fig. 1.

As the temperature was increased from 1350 to 1700°F, the break-through pressure decreased from 107,000 to 71,000 psi. The runout pressures were in approximately the same order, but increased to about 105,000 psi near the end of the extrusion stroke.

Examination of the skulls from the billets extruded through flat-face dies revealed that a stagnant zone of metal existed at the front end of the billet during extrusion. Because the frictional forces are higher at the die face than along the container wall, the flow of metal at the die shoulder is retarded.

As a result, the flow surface occurs at some angle to the die face causing the surface skin of the billet to enfold toward the die opening during the latter half of the extrusion stroke. An etched section of the skull of an unalloyed billet extruded in a 120-degree die and free of laminations is shown in Fig. 6.

Generally, the surface condition of the unalloyed and Ti-3Mn-complex bars extruded with flat-face dies was very poor. All of the bars had scored surfaces. These would require additional finishing operations to meet commercial requirements. This condition was attributed directly to the type of metal flow that occurred.

Eliminate stagnant metal

The stagnant-metal zone produces two effects that lead to the formation of imperfections in the surface of the extruded bars. First, lubricant on the container wall is trapped. Thus insufficient lubricant is available at the die face to prevent seizing of the titanium on the die. This produces tears and scoring on the surface of the bars.

Secondly, the flow surface assumes an irregular shape with heavy striations. During extrusion, these striations are compressed to form deep seams in the bars.

These tests showed that a conical die having the proper included angle should eliminate the stagnant-metal zone and thereby improve the surface quality of the extrusion.

Studies of the effect of conical dies were made with unalloyed titanium. The billets were extruded at 1600°F through dies having included angles of 180 (flat face), 160, 140, and 120 degrees. The dies had a 3/16 in. radius at the opening and a 3/16 in. bearing length.

Extensive testing indicated that the 120-degree die completely eliminated the stagnant-metal zone. With this die, the flow of metal was uniform across the billet.

Titanium pickup occurred at the radius of the die opening on the flat-face die and, to a lesser extent, on the 160-degree die. No pickup occurred with the 140- and 120-degree dies.

This indicated that better lubrication of the die face was attained with the smaller included angles. Similarly, the surface finish of the bars improved as the die angle increased.

The extrusion pressure was measured in each of these tests. Calculations indicated that the force required to accomplish deformation decreases as the included die angle decreases from 180 degrees to some critical angle between 140 and 120 degrees. Below this angle the pressure increases sharply. The optimum die angle for rounds was found to be about 130 degrees.

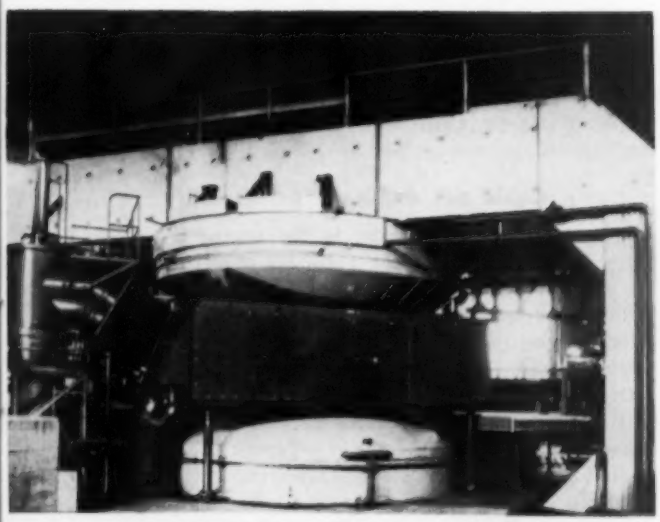
In modified cyclotron—

Measure Heavy Forces To Avoid Excessive Bolt Loading

◆ Magnetic forces of about 2 million lb must be held by high-strength bolts used in the modified cyclotron at the University of California's Radiation Laboratory . . . Two steps were taken to assure safe loading during operation.

◆ Unless the cyclotron pole plates are tight, the magnetic forces separate them further until they literally tend to fly apart . . . To overcome this tendency, the pole bolts are preloaded . . . A special sensing element measures the full-size forces which could not be duplicated from a scale model.

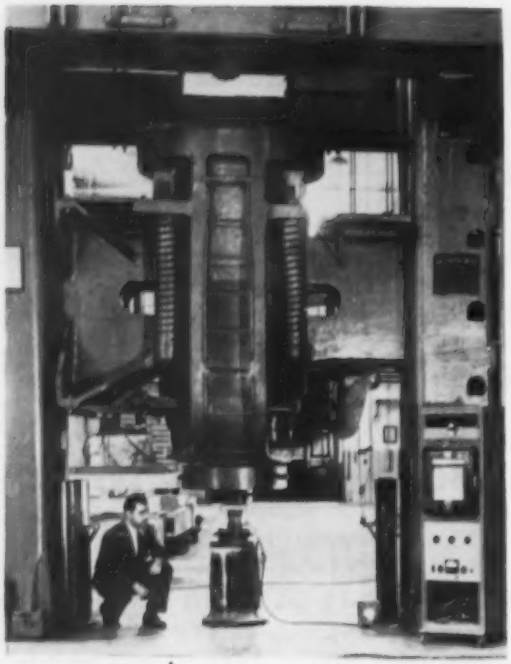
By D. T. SCALISE, Radiation Laboratory, University of California, Berkeley, Cal.



CYCLOTRON at University of California will have proton beam energy 110 pct higher after modifications, now being made, are completed.

◆ MODIFICATIONS now under way on the 184-in. cyclotron at the University of California's Radiation Laboratory have created some unique structural problems. One of these has been a means of determining the forces which bolts must withstand in holding the steel magnet pole plates together. Measurements were scaled from a 1/16-size model, but to assure greater accuracy and a more positive degree of safety, special equipment and methods have been devised for preloading and measuring strain on the high-strength bolts.

The design objective of the modification is to increase the energy of the nuclear particle beam in the cyclotron. Some of the modifications are shown in the sketch in Fig. 1. The proton beam energy will be increased 110 pct to approximately 730 million electron volts. This energy will be the highest of any cyclotron in the world, including the recently announced 660-Mev proton beam from a Russian cyclotron and the 450-Mev proton beam from the University of Chicago's cyclotron.



ANNULAR type load cell, used to measure full-size forces of cyclotron, undergoes calibration test on 4-million lb Baldwin tester.

The source of the nuclear-particle beam is located midway in the 12-in. magnet gap on the vertical centerline of the 184-in. cylindrical poles. From the source, the beam spirals outward, gradually increasing in energy. The centrifugal force on the beam at its final orbit radius must be balanced by a centripetal force, which is provided by the magnetic field in the gap. Thus, increasing the beam energy will require a higher field.

For the modified cyclotron, the magnetic field intensity will be increased approximately 50 pct to 23 kilogauss. This will be accomplished by decreasing the magnet gap from 19⅛ in. to 12 in. and by adding two "auxiliary coils" which will provide 1.15 megampere-turns in addition to the existing 1.88 megampere-turns provided by the existing "main coils."

The high magnetic field creates some structural problems. The field saturates the iron in the poles and interacts with the complex coil geometry. This causes the poles to be attracted toward each other with very high forces. These magnetic forces, scaled from 1/16-size model measurements, were determined to be about 2 million pounds, equivalent to the weight of five railroad locomotives.

The model test data also indicated that the steel plates making up the 184-in. diam. poles are in a state of unstable equilibrium. That is, once the plates start to separate, the magnetic forces become magnified and cause the plates to separate further. In fact, they literally tend to fly apart. To overcome any tendency for the separation to start, it is essential that the plates be squeezed together as tightly as possible by preloading the pole bolts before the magnet is turned on.

Several methods of preloading the high-strength bolts were considered. The first method was to use a torque wrench, but this was quickly discarded because of the torsional stress imposed on the bolts. Also, because a force of several tons would be required on a wrench with a 20-ft handle.

Another method considered was heating the bolts to lengthen them before tightening the nut. However, this was far more complicated and more expensive than the third method. The hydraulic jack method illustrated in Fig. 2 was the best solution to the problem.

The hydraulic jack of 300-ton capacity was specially designed. It has a central hole in the piston through which the force can be transmitted to the bolts. In the preloading process the bolts will be stretched about ⅜ in. by the jack, thus permitting the nuts to be hand-tightened until they are seated. The jack will be supported by a sleeve that surrounds the bolt end, nut and load cell, and transmits the force to the opposite end of the bolt. On application of hydraulic pressure, the bolt is stretched to the required length and preload.

There are 26 high-strength bolts supporting the pole bases. Nineteen bolts are in the upper pole and yoke of the cyclotron and seven in the lower pole and yoke. These bolts are 15 feet long and 3.5 in. in diameter. They are made of 4340 nickel-chrome-moly steel heat-treated to a yield strength of 100,000 psi or a total strength of a million pounds per bolt.

In addition to the magnetic forces on each pole, the weight and vacuum loads will be supported by the pole bolts. The maximum load on any bolt is expected to reach approximately 350,000 lb. During initial installation, the bolts will be preloaded to approximately 450,000 lb. It is not expected that this preload will be exceeded during cyclotron operation when the magnetic forces are applied.

Could not duplicate permeability

Large errors are inherent in the magnetic-force measurements on the 1/16-size model of the cyclotron magnet because the permeability of the full size magnet core could not be duplicated. If the magnetic forces on the full-size magnet became excessive, the bolts might fail, with serious consequences. Therefore, to ensure that the forces do not become excessive, it is important to measure the full-size forces as the magnet is energized gradually during the initial cyclotron start-up.

A novel method for measuring the bolt loads has been devised and will be incorporated in the rebuilt cyclotron. Several methods were considered. Extensometers were not feasible be-

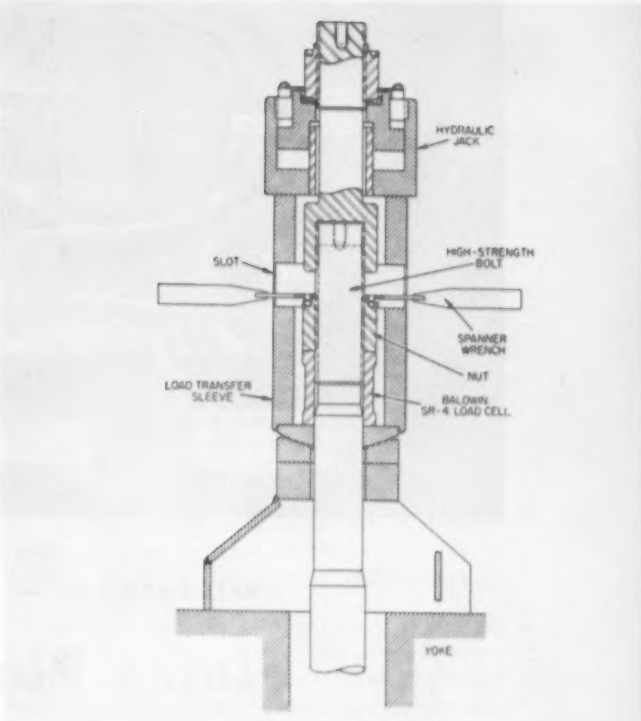
cause of space limitations and because remote indication would be difficult.

Strain gages attached to the bolts were also undesirable because (1) calibration would be difficult, (2) replacement of the strain gages would be impractical due to their inaccessibility after installation of the bolts, and (3) the more permanent strain gages would require a Bakelite base with special sealing material cured at an elevated temperature which might disturb the bolt heat treatment and be quite expensive.

The method selected is quite simple. It permits measuring the strain on large bulky bolts without direct attachment of strain gages to the bolts. It also permits easy access to, and replacement or recalibration of, the load-sensing element without removing the bolt.

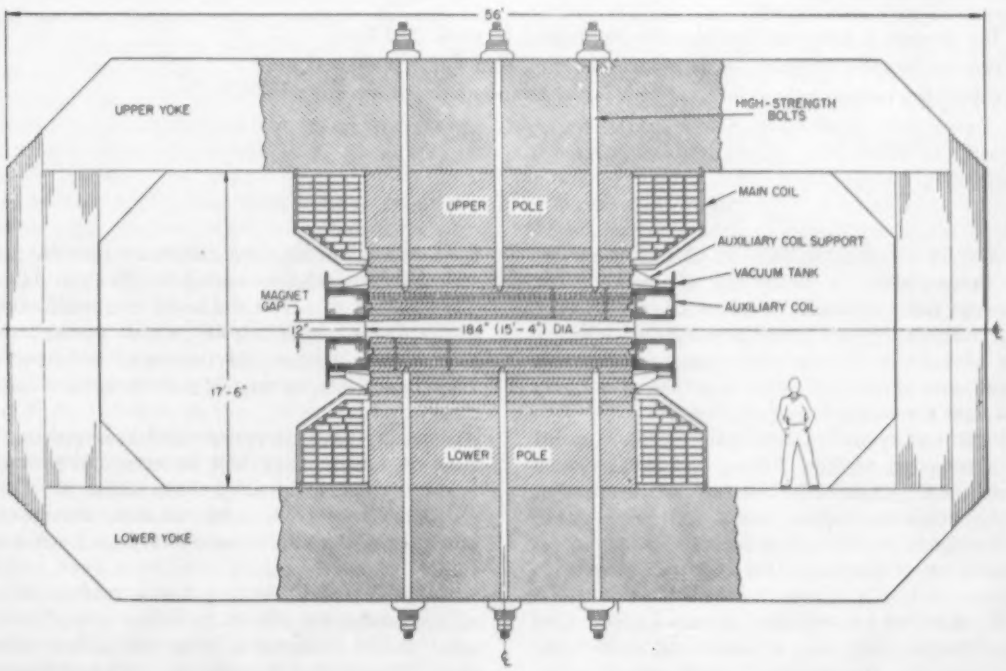
The special load-sensing element is shown in Fig. 2. It is simply a washer to which strain gages are attached. The annular-type load cells were specially designed and built by Baldwin-Lima-Hamilton Corp., Cambridge, Mass. These load cells are only 6 in. long and 6 in. in diameter, but have a capacity of one million pounds, an extremely small deflection under load, and high sensitivity.

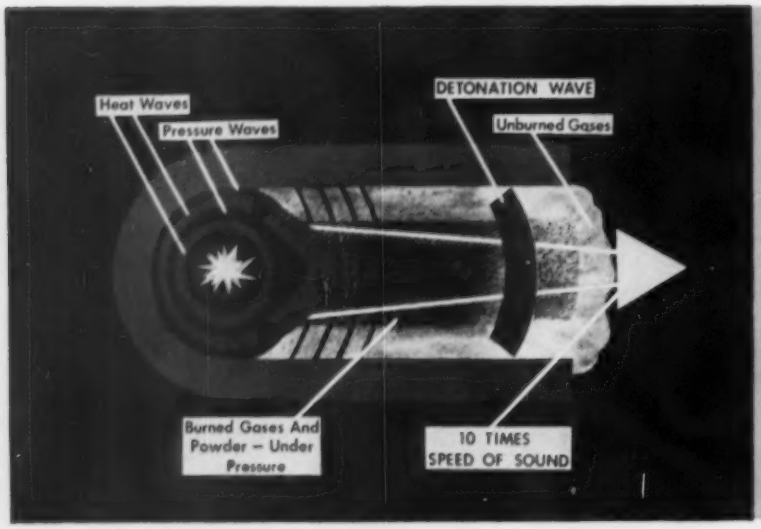
The resistance-wire strain gages bonded on these units will sense the bolt loads and transmit them electrically through an electronic amplifier to a central recorder. The strain gages are connected in a bridge circuit, and the unbalance is indicated in a self-balancing recording potentiometer.



Above: **Fig. 1—Diagram of 184-in. cyclotron magnet shows location of high-strength pole bolts and the reduced 12-in. magnet gap.**

Below: **Fig. 2—Enlarged detail of yoke and pole bolts show temporary preload equipment. Force applied by hydraulic jack stretches bolt about 3/8 in.**





HOW FLAME PLATING WORKS: Spark ignites oxygen and acetylene, producing heat and pressure waves. Detonation occurs when heat waves move faster than pressure waves. When pressure block created by heat is broken, carbide powder is hurled at workpiece surface at supersonic speed.

Parts keep cool—

Flame Plating Clads For Better Wear Resistance

◆ Flame plating applies a tough, wear-resistant surface where it can do the most good . . . Tools, gages, bearing surfaces are among the many successful, money-saving applications . . . A flame-plated plug gage is claimed to give longer service life.

◆ The process is extremely flexible, can be applied to steel, cast iron, aluminum, copper, titanium—even magnesium . . . And flame plating doesn't overheat the surface being clad . . . Base metal temperatures rarely exceed 400°F.

◆ A TOUGH WEAR-RESISTANT surface can be flame-plated on a variety of metal parts. Among the successful commercial applications are tools, gages, and bearings surfaces. Added to the advantages of long wear, flame plating provides good adherence to the base metal and does not heat the workpiece above 400°F.

Most metals and alloys can be flame plated with tungsten carbide. Among the metals which have been successfully coated are: steel, cast iron, aluminum, copper, brass, titanium, bronze and magnesium. Tungsten carbide cannot be deposited on chromium-plated objects nor carbide alloys.

Hardness of the coatings averages about 1350 Vpn. Theoretically, this is equivalent to 89.3 Ra. But, actually, the particles which make up the coating are harder. The difference between particle hardness and measured hardness is due to the cobalt matrix. The end result is a combination of hardness and flexibility which gives flame-plated parts longer life than may be expected from materials having higher measured hardness.

Coatings have corrosion resistance similar to that of cobalt. They will be attacked by most acids and strong alkalies. They suffer no detrimental effects from mild alkalies, detergents, lubricating oils and atmosphere free from acid fumes.

An as-deposited coating has a surface finish of approximately 125 microinches rms. To the touch and in appearance, it resembles fine emery cloth. This surface is useful, without grinding or

polishing, for many non-precision parts such as dogs and other gripping devices which require a certain degree of roughness.

Many non-precision parts require an intermediate finish. This can be done by lapping, flexible belt grinding or brush finishing. In performing these operations, overheating must be avoided. Finish grinding or lapping usually removes 0.003 to 0.004 in. of the coating thickness. Resinoid bonded diamond wheels are recommended for these operations. Flood cooling with water-soluble oil and water must be used.

Flame plating is particularly useful for plug gages, spindles, mandrels, bearings, and many other items subjected to constant and heavy wear. Flame plated plug gages, for example, last three times as long as solid tungsten carbide gages. In the case of turbine engine seals, service life has been doubled.

Reduce downtime

In addition to longer life, flame-plated machine parts reduce downtime, decrease inventory of replacement parts and lower maintenance costs. A cold-forming die used in an automotive plant is a case in point. A flame-plated die produced a quarter of a million parts and lasted seven weeks without maintenance. Die used formerly lasted four weeks and had to be polished every other day after turning out 14,000 pieces. In this application, total savings were about $1,200.

In other applications, a combination of properties is used advantageously. Bushings for ball piston pumps serve as an example. The ball pistons ride in the flame-plated bushings which are inserted in the cylinder block. The inner bushing surfaces must maintain close working tolerances for long periods. Carbide inserts were first used, but differences in thermal expansion between the insert and the cylinder block created difficulty.

By flame-plating a steel bushing, the coefficient of thermal expansion was about the same as that of the steel ball and cylinder. Thus, the problem was eliminated. Moreover, service life of the steel bushing was comparable to that of the carbide insert.

In another application, wire forming mandrels coated with tungsten carbide lasted ten times longer than the other types of mandrels previously used. In addition, it was possible to increase the speed of the machine from 45 to 78 pieces per minute—a 74 pct increase.

Disk-like skiving knives, used for slicing rubber into strips have a 30° bevel on one side only. The high abrasion of the rubber shortened the life of unplated knives considerably. In fact, the knives were removed and sharpened after every shift. By plating one side of the knives with tungsten carbide service life has been increased by as much as 30 times. Moreover, the plated knives have a self-sharpening effect.

Heat waves traveling at ten times the speed of sound and pressure of 10,000 psi literally blast tungsten carbide particles from a specially constructed gun at a velocity of 9000 fps. This, essentially, is the unique method by which highly wear-resistant surfaces are applied to workpieces. This process, known as flame plating, was developed at the Acetylene Research Laboratory of Linde Air Products Co., Speedway, Ind.

The key to flame plating is controlled detonation. The gun in which the reaction takes place consists of a barrel and a mechanism for loading precise quantities of tungsten carbide powder, acetylene and oxygen into a firing chamber. The tungsten carbide powder remains suspended in the explosive gas mixture as a spark ignites it, producing heat and pressure waves.

The barrel's confining shape concentrates the waves in a small area. In so doing, it builds up tremendous heat and pressure. At a temperature of about 6000°F, the heat waves begin to move faster than the pressure waves—a phenomenon called detonation. The heat wave, or detonation wave, rips through the gas and powder mixture at ten times the speed of sound and completely burns the gases. It leaves behind a solid block of pressure in which the tungsten carbide powder is suspended.

Pressure inside the barrel reaches 10,000 psi in three-thousandths of a second. When the detonation wave leaves the gun's muzzle, it turns into a shock wave and dissipates into the air. Gases, jammed in the gun barrel, burst out carrying the powder with them. First, pressure built up at the mouth of the gun breaks loose. This allows the gases further back to rush out.

The tungsten carbide particles, which have now become partially molten, are hurled from the barrel at the workpiece at 9000 fps. Blast after blast hits the workpiece surface, building up and fusing the tungsten carbide particles until the desired thickness is attained.

Dimensions don't change

A desirable feature of the process is that although the temperature inside the gun barrel reaches 6000°F, the workpiece temperature rarely exceeds 400°F. Because of this, precision and semi-precision parts can be flame plated without changing their metallurgical properties or physical dimensions.

The tungsten carbide coating is composed of tungsten, carbon and 8 pct cobalt. It differs basically from a cemented carbide structure in that its complex series of phases is derived from the W-C-Co system rather than a simple two-phase WC-Co type structure.

Etching clearly reveals that the coating consists of layers or laminae. Each layer contains bodies that are flattened, spherical or angular, large or minute.

Coating thicknesses that can be applied range from 0.002 to 0.010 in. A distinct boundary exists between the coating and base metal, but there is no visible oxide layer. The interlocking bond which is formed is extremely tenacious and is believed to be more than just mechanical. Since the coating and base metal do not mix, each retains its own properties.

On integrally-stiffened spars—

Sculpturing Mill Lowers Machining Time

◆ THE JET AGE has posed many problems for the aircraft engineer. Among these is the need for parts that are lighter in weight yet stronger than those for propeller-driven aircraft where stresses are not as severe.

At Douglas El Segundo the A4D Skyhawk, a midget bomber, is a working example of weight-saving techniques. During World War II, comparable fabricated spars for propeller-driven aircraft required 265 hours fabrication time per spar and a machine tool investment of over $300 thousand.

Parts are stronger

The integrally-stiffened spar of today's A4D Skyhawk calls for only 24 hours of milling with a tool investment of $130 thousand. And the spars are proportionately stronger.

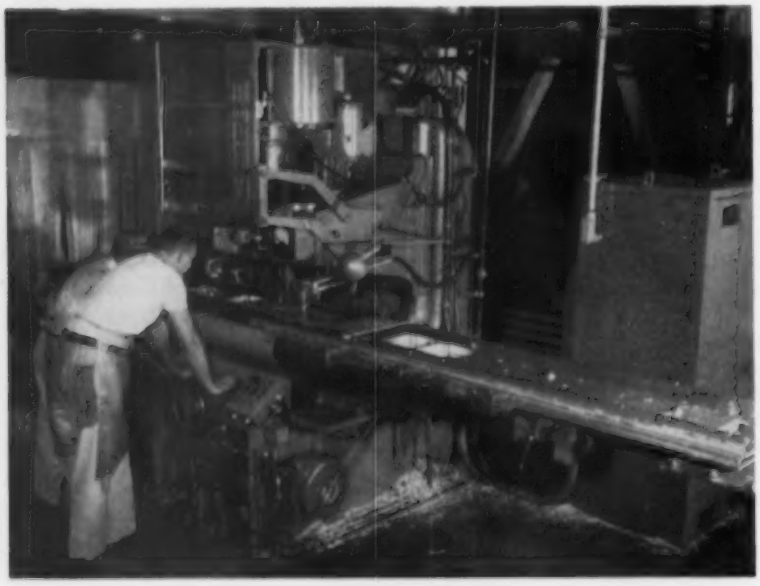
Spars begin as blanks of 2-in. stock. They range in width and length, the longest being 27 ft with a width of 14 in. They are milled on Onsrud Invomils modified to Douglas specifications. The bed of the mill traverses under the router-like cutting tool so that one setup of the blank suffices for the complete machining of the part.

Low-cost segmented steel templates are indexed to the blank and contouring is controlled from a control board directly in front of the cutter. As each section of the part is completed the steel template is quickly removed and the next template in sequence is indexed to the part.

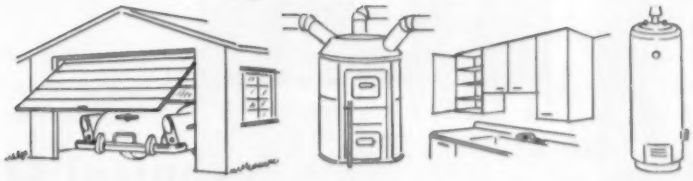
This high-speed sculpturing mill is accurate to close tolerances. It requires only 400 sq ft of manufacturing floor space.

Spars for the A4D wing tank that make up the backbone of the wing are of three types: the front spar, the intermediate spar and the rear spar. Their weights in the blank stage are 665, 500 and 375 lb respectively.

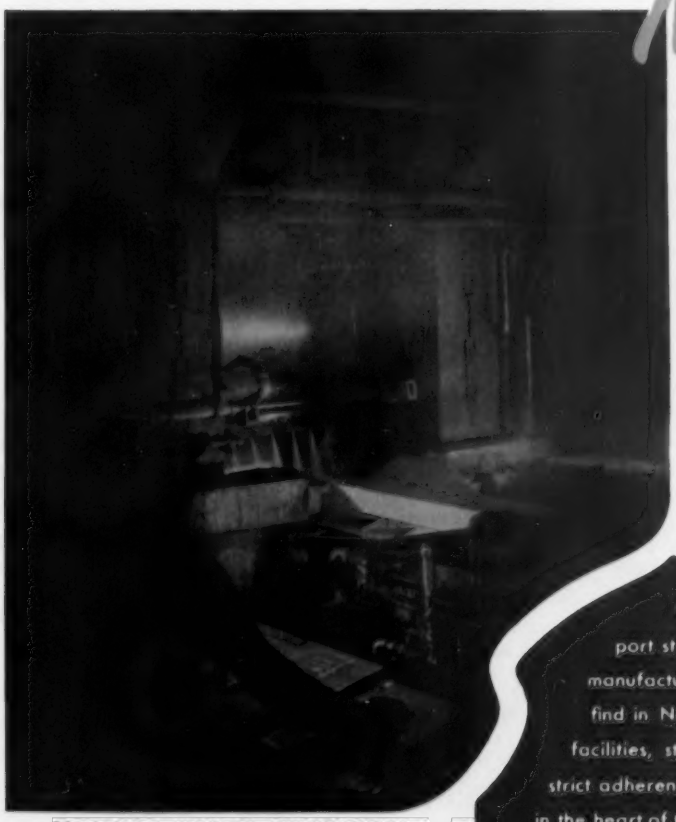
Completely sculptured, these integrally-stiffened spars weigh 78, 68 and 33 lb, for a metal removal in the neighborhood of 80 pct. From weight analyses of comparable made-up structures this one piece spar construction has a weight saving of 20 pct at no sacrifice of strength and at lower production cost.



MILLING integrally-stiffened spar in sculpturing mill. Steel template is in place over the work.



ROLLING STEEL FOR HOME BUILDING... AT Newport Steel



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New Technical Literature:

Tool pre-treatment

A technical fact sheet on "dag" colloidal dispersions for tool pre-treatment, first of a series of fact sheets, has just been published. It discusses pretreatment of dies, piercers and tools used in metal forming operations. Suggestions for lubrication during the critical break-in period are offered. *Acheson Colloids Co.*

For free copy circle No. 1 on postcard, p. 97.

Metallurgical chart

An 8½ by 11-in., black and white version of the Basic Guide to Ferrous Metallurgy provides a handy reference source for the engineer, metallurgist and skilled worker. It shows principal characteristics of steels to 0.9 pct carbon across the temperature range to 2900°F. Important working zones are shown, common metallurgical terms are defined and a diagram symbolizes change in grain size with temperature. *Tempil® Corp.*

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Gear-shaving machines

Gear shaving machines, gear inspection equipment, gear lapping machines, gear grinding machines, self-contained broaching fixtures and broaches are described in a 16-page catalog. *National Broach & Machine Co.*

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Aluminum products

A 12-page bulletin explains how cast aluminum tooling plate and bar stock is being applied in industry to save time and reduce costs. The bulletin tells how the product is made, describes some special properties and advantages over other materials, and suggests applications where cast plate and barstock can be used to advantage. Specification data is included. *Red Seal Metals Co.*

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FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 97.

Heating elements

Electric heating elements for industrial, commercial and domestic use are covered in a new 24-page booklet. Tubular, strip, water and oil immersion types and domestic water heating elements in both standard and custom made design are included. Application and engineering data, together with price lists, facilitate fast and easy element selection. *Cutler-Hammer, Inc.*

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Stainless steel fastenings

All types of stainless steel fastenings available from stock are covered in a 24-page catalog. Included are standard stainless steel specifications and corrosion resistance tables helpful in selecting the various types of stainless alloy grades Diagrams and charts of sizes of the fastenings are given to facilitate ordering. *Star Stainless Screw Co.*

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Fork truck drive

Advantages of the TowmoTorque Drive, an automatic transmission for fork lift trucks, are listed in a new booklet. The literature describes the drive, available for almost all models, as combining the features of automotive type torque converter drives with such advanced design principles as Creep-Control, which permits "inching" the truck along while maintaining high engine speed for full lifting power. *Towmotor Corp.*

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FREE TECHNICAL LITERATURE

Gaging machines

Sigmatic multi-dimension gaging machines for in-process gaging and final inspection are covered in pictures and text in a 12-page catalog. Advantages, construction features and specifications of most semi-automatic machines are given. *Pratt & Whitney Div., Niles-Bement-Pond Co.*

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Automatic turret lathe

Construction features, specifications, special attachments and standard tooling for the Model 4-U automatic turret lathe are discussed in a 12-page bulletin now offered. Other automatic turret lathes offered are listed. *Potter & Johnson Co.*

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Instrument bibliography

Bulletin 100-D is a comprehensive 24-page index of Industrial Division literature, broken down by subject, industry and product. It includes catalogs, bulletins, specification sheets, data sheets, and articles which have appeared in *Instrumentation* magazine. *Minneapolis-Honeywell Regulator Co., Industrial Div.*

For free copy circle No. 10 on postcard, p. 97.

Flexible mechanical couplings

A reference catalog on flexible, gear-type mechanical couplings is intended for designers, specifying engineers and purchasers. In 12 pages, the new Sphereflex line of curved root, and spherical tooth couplings are covered and complete data on installation, service factors, proper selection, specifications and lubrication are given. *Philadelphia Gear Works.*

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Forged weldless rings

"How Forged Weldless Rings and Flanges Improve your Product and Cut your Costs" is discussed in a 12-page bulletin now offered. Some applications of the product in industry are shown. *Standard Steel Works Div., Baldwin-Lima-Hamilton.*

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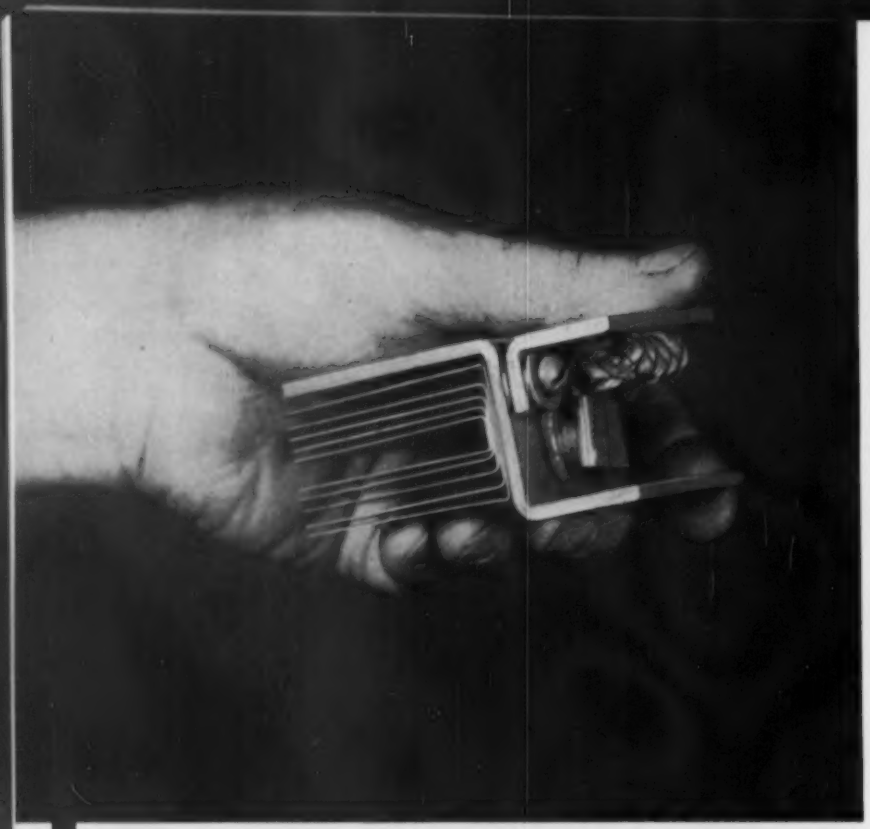

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Carbide compositions

Kennametal is discussed in a 24-page booklet now available. The company's production operations and typical applications for the product are included, together with a discussion of the material's characteristics. The various grades are shown, and suggestions are offered on how thermal expansion affects design. *Kennametal Inc.*

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Construction sheets

"Steelcraft Tapered Rigid Frame Building" shows erection photos of various structures or sections of structures. Details of ridge splices, haunch splices, base shoe, girt connection, eave strut and other construction are shown. *The Steelcraft Manufacturing Co.*

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Surface grinders

Specifications, construction and operating features of the Type D hand fed surface grinder are covered in a new folder. Clearance diagrams and floor plans are included. *The Thompson Grinder Co.*

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Formed tubes

"Take a Look at Formed Tubes," a 16-page bulletin, shows how the company is conveniently situated to manufacture electrically welded steel tubes and to form and fabricate steel, copper, brass, Monel, stainless steel, aluminum and other special alloys. Plant facilities and operations are shown and some key personnel are introduced. *Formed Tubes, Inc.*

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Finishing recommendations

Finishing recommendations made by the Customer Service Laboratory for many die cast items ranging from automotive door handles to camera rangefinders are described in Technical Bulletin PP-125. Recommendations included type and size of buff or wheel, minimum number of operations required, wheel speed, necessary abrasives or compositions, etc. *Frederic B. Stevens, Inc.*

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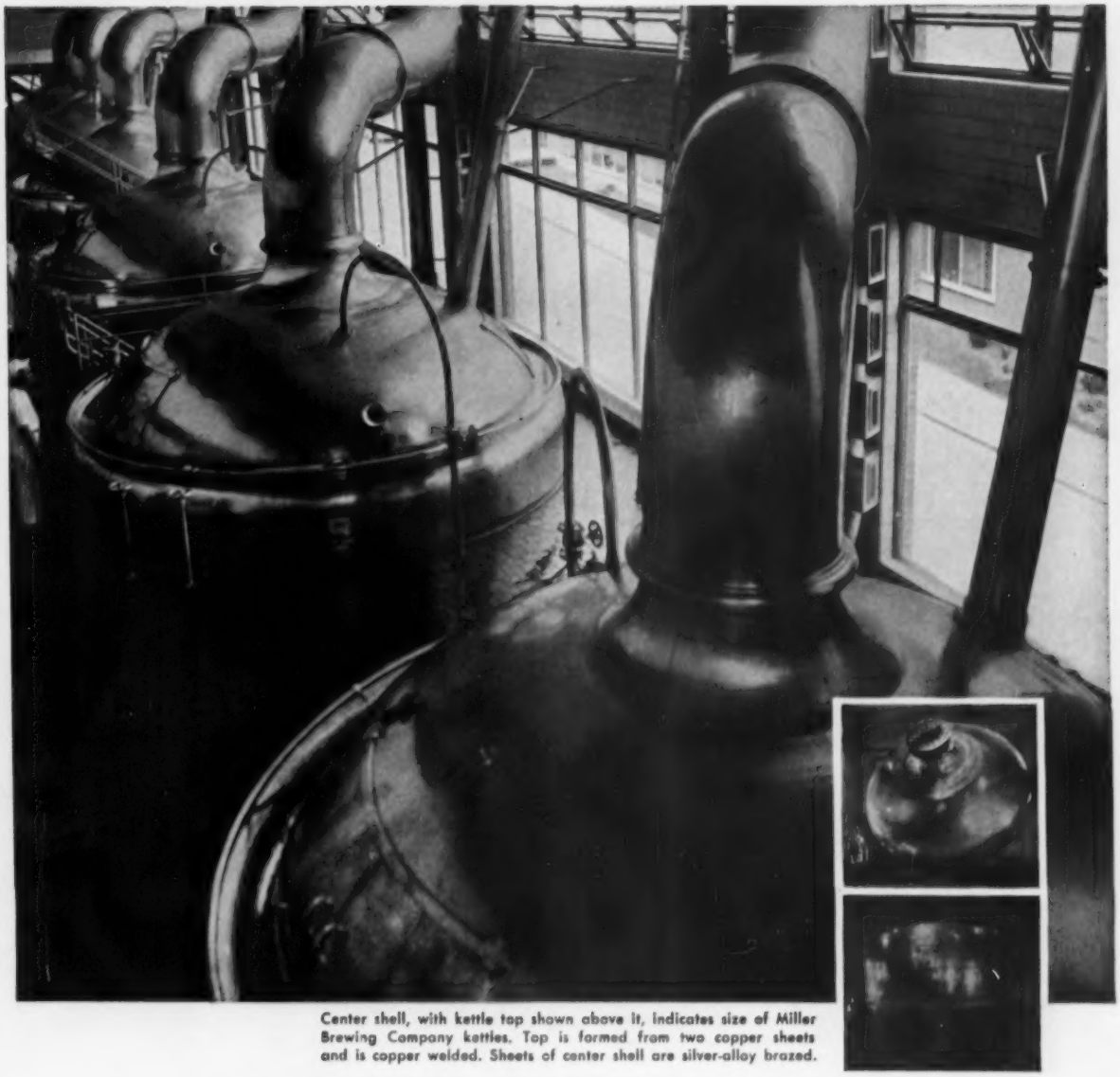

Center shell, with kettle top shown above it, indicates size of Miller Brewing Company kettles. Top is formed from two copper sheets and is copper welded. Sheets of center shell are silver-alloy brazed.

500-barrel copper brew kettles take super-size Anaconda copper sheet

The copper brew kettles you see here each hold 15,500 gallons of Miller High Life Beer. They are designed and fabricated to Miller's specifications by an old hand at brewery copper work—115-year-old Deckebach Sons Company of Cincinnati, a division of Brighton Copper Works, Inc. Deckebach called on the metallurgical and manufacturing abilities of Anaconda to produce the unusually large size copper sheet in the heavy sections they needed for the job. Anaconda copper sheets as large as 117″ x 234″ x .134″ were used.

The kettles are made of copper; in addition, the bottoms are encased by steam jackets made from Everdur* circles 136″ in diameter and ½″ thick. Everdur is an Anaconda Copper-Silicon Alloy with high corrosion resistance. Each kettle and jacket contains about 7 tons of copper and Everdur. Body seams are silver-alloy brazed and the two-piece tops are copper welded.

Anaconda mills, warehouses and distributors throughout the country are always ready to give you fast service when you need copper, brass, bronze in sheet, plate, wire, rod and tube. At most locations, you can also have metal sawed, slit or sheared to exact sizes. If special problems arise, write directly to *The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.* 55112

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Copperweld leaded steels with "built-in productivity" are excellent steels for automation.

ARISTOLOY STEELS

For further details, write for free booklet, "Lead Treated Steels"

COPPERWELD STEEL COMPANY • STEEL DIVISION • WARREN, OHIO
EXPORT: Copperweld Steel International Co., 117 Liberty St., New York 6, N. Y.

FREE TECHNICAL LITERATURE

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

This section starts on p. 92

Sling handbook

A new and enlarged 60-page Sling Handbook outlines new devopments in Tuffy Slings and includes material describing 16 different factory-fitted slings and nearly two dozen standard sling fittings. Also included are a complete rigger's manual, shop chart of proof tested ratings for the slings, a new engineers' notebook and standard signals for directing operations of overhead traveling cranes, derricks and locomotives. *Union Wire Rope Corp.*

For free copy circle No. 18 on postcard.

Protective coating

General, physical, and chemical properties of Amercoat No. 87 vinyl mastic coating are covered in a new leaflet. Described as combining the density and impermeability of a vinyl coating with the thickness of a mastic, the product is said to provide a continuous, corrosion-resistant coating even over rivets, welds, angles and edges difficult to coat with thinner materials. *Amercoat Corp.*

For free copy circle No. 19 on postcard.

Production facilities

Production processing and service facilities, including precision tools, materials, and processes developed in watchmaking operations, and now available to other precision manufacturers are covered in a 32-page booklet. Productive capabilities in plate processing, mass production of small precision parts, tool and die production, metals processing and assembly and development are shown. *Hamilton Watch Co., Allied Products Div.*

For free copy circle No. 20 on postcard.

Screw machines

A 6-page folder is available describing the "unit construction" principle of the Detroit Screwmatic 750 single spindle automatic screw machine. The literature describes how, as new developments are introduced in any of the 10 machine units, they may be individually purchased to keep the machine up-to-date for many years. Other advantages, standard equipment available and capacities of the machine are presented. *The Gear Grinding Machine Co.*

For free copy circle No. 21 on postcard.

Woven heat elements

A fact-filled folder about various kinds of woven heat elements and their insulation is offered. It shows how neoprene rubber's properties of excellent flexibility and good resistance to erosion and weather make it useful for de-icing aircraft propeller blades, etc., and how silicone rubber plays a vital role for applications where higher heat is in demand. *Safeway Heat Elements, Inc.*

For free copy circle No. 22 on postcard.

Steelmaking methods

"How Steel Is Made at Rotary," a 24-page color booklet, shows the company's facilities for production of alloy, stainless and carbon steels in slab, billet and bar forms, and follows operations from selection of raw materials through storing of the finished steel. Operating and technical personnel are introduced. *Rotary Electric Steel Co.*

For free copy circle No. 23 on postcard.

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FIRST CLASS PERMIT No. 36 (Sec. 34.9 P.L.&R.) New York, N. Y.

BUSINESS REPLY CARD

No postage necessary if mailed in the United States

POSTAGE WILL BE PAID BY

THE IRON AGE

Post Office Box 77

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NEW YORK 14, N. Y.

Aluminum nameplates

"Branded for Life," a 4-page folder, describes how Metal-Cals may be used for quick, economical trademarking, serial numbering, service labeling, catalog and parts numbering and dial and gage marking. The literature shows a variety of applications for the anodized, etched aluminum nameplates, on metal, porcelain, glass and other products. *C&H Supply Co.*

For free copy circle No. 24 on postcard.

Press room equipment

Friction type roll feeds, stock straighteners, wire straighteners, scrap choppers, foot presses, coil cradles, etc., are described in a 20-page booklet on press room equipment. Specifications and price information are given. *Durant Tool Supply Co.*

For free copy circle No. 25 on postcard.

Investment casting

A brochure, "Design with Microcast in Mind," outlines in pictures and text the steps involved in investment casting and shows a wide range of intricate parts that may be mass-produced by the method. Booklet includes the most recent table of properties of investment cast alloys. *Austenal Laboratories, Inc., Microcast Div.*

For free copy circle No. 26 on postcard.

Machinery center

Machinery Sales Sheet No. 19 describes the F.J.E. Machine Center in London, England. Facilities of the Center, built in 1952 to give engineering industry fullest possible service in technical advice, selection and practical demonstrations of any machine offered, are illustrated and explained. *F. J. Edwards Ltd.*

For free copy circle No. 27 on postcard.

Press room equipment

Described in a 4-page catalog are newest available press room equipment items, including combination cradle and straightener, centering reel, coil stock cradle, punch press gripper feed units, scrap cutters, power driven stock straightener, and rewinders for paper or scrap. *Sesco Incorporated.*

For free copy circle No. 28 on postcard.

FOR MORE LITERATURE

Many companies offer free literature and other information in their advertisements. For the names of these firms see the company listings in the index of advertisers.

Cold-Roll forming book

The fourth edition of "Cold Roll Forming," a comprehensive, 88-page book, tells the story of the equipment and process of cold roll-forming and describes end uses of its products, their advantages and commercial possibilities. Also covered are auxiliary equipment for curving, coiling, ring-forming, notching, perforating, welding, embossing, automatic cutoff and other operations frequently incorporated in cold-forming production lines. *The Yoder Co.*

For free copy circle No. 29 on postcard.

Cap nuts

Sizes and dimensions of closed-end and open-end type zinc alloy cap nuts are listed in this single-page bulletin. The GRC cap nuts are described as showing neither tool marks nor cutoff marks, and offering clean, accurate threads. *Gries Reproducer Corp.*

For free copy circle No. 30 on postcard.

Magnetic starters

The complete line of G-E magnetic starters for air conditioning and refrigeration equipment is shown in bulletin GEA-6301. Features, ratings, dimensions, wiring diagrams, and installation requirements are included. *General Electric Co.*

For free copy circle No. 31 on postcard.

Part winding motors

Bulletin PW-1 gives current and torque data on part winding motors from 5 to 200 hp, together with typical installation data. The motors are described as available for normal and high torque applications, in all standard enclosures. *Howell Electric Motors Co.*

For free copy circle No. 32 on postcard.

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NEW YORK 14, N. Y.

FIRST CLASS PERMIT No. 36 (Sec. 34.9 P.L.&R.) New York, N. Y.

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It's outstanding!

EVERY MANUFACTURER who tries Roebling high carbon flat spring steel discovers the same thing... that this spring steel is absolutely unexcelled for dimensional and mechanical uniformity... for speeding production and cutting down rejects.

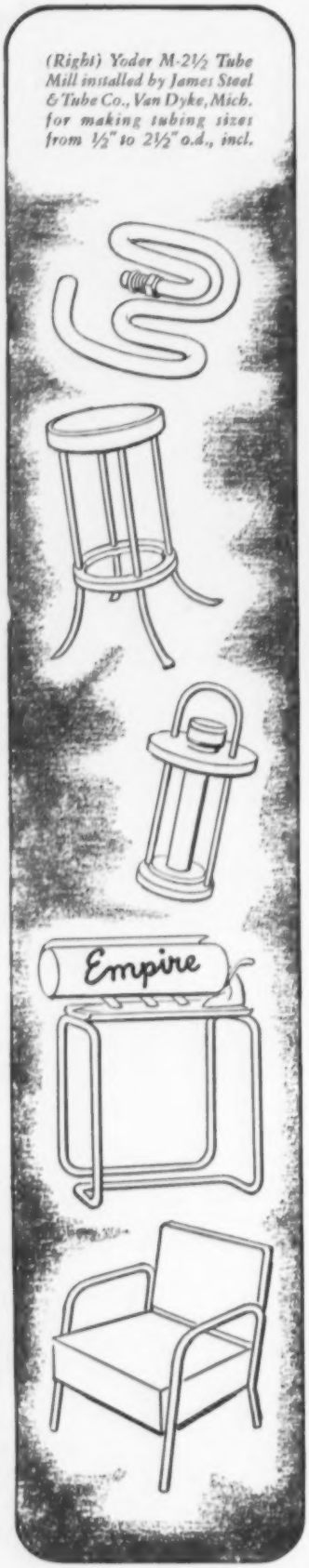
You always *pay* for the best when you buy flat spring steel... make sure you *get* it by specifying Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

Empire State Building, world's tallest building.

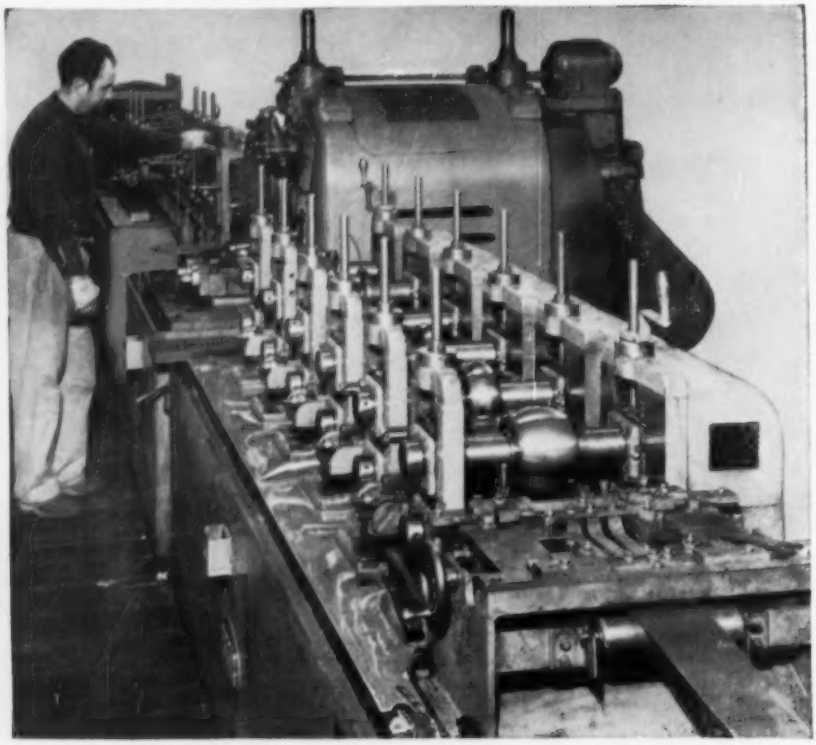
ROEBLING CF&I

A subsidiary of The Colorado Fuel and Iron Corporation

BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.



(Right) Yoder M-2½ Tube Mill installed by James Steel & Tube Co., Van Dyke, Mich. for making tubing sizes from ½" to 2½" o.d., incl.



Plain Facts about

ELECTRIC-WELD TUBE MANUFACTURE

In tube making everybody wants the highest possible speed consistent with good, strong welds and dimensional accuracy. There are, in addition, at least three more essentials to profitable tube making, namely:

1. Low scrap losses—because cost per foot of strip metal is many times greater than the conversion cost.
2. Fine exterior finish, free from scratches, scuff marks and other irregularities which limit usefulness and lower salability.
3. Quick and easy mounting and adjustment of tooling, to reduce time losses between successive production runs.

Yoder tube mills excel in all these respects and have other mechanical, electrical and economic advantages. Because Yoder tube mill owners have found from experience their performance is as good as our promise, there are more Yoder mills sold and in operation than all other electric-weld mills combined. This is as true today as it was ten years ago.

If you want the plain facts about the things to look for in a tube mill, to insure most profitable operation over the years, the new Yoder Tube Mill Book will give them to you, in the simplest language and with numerous illustrations.

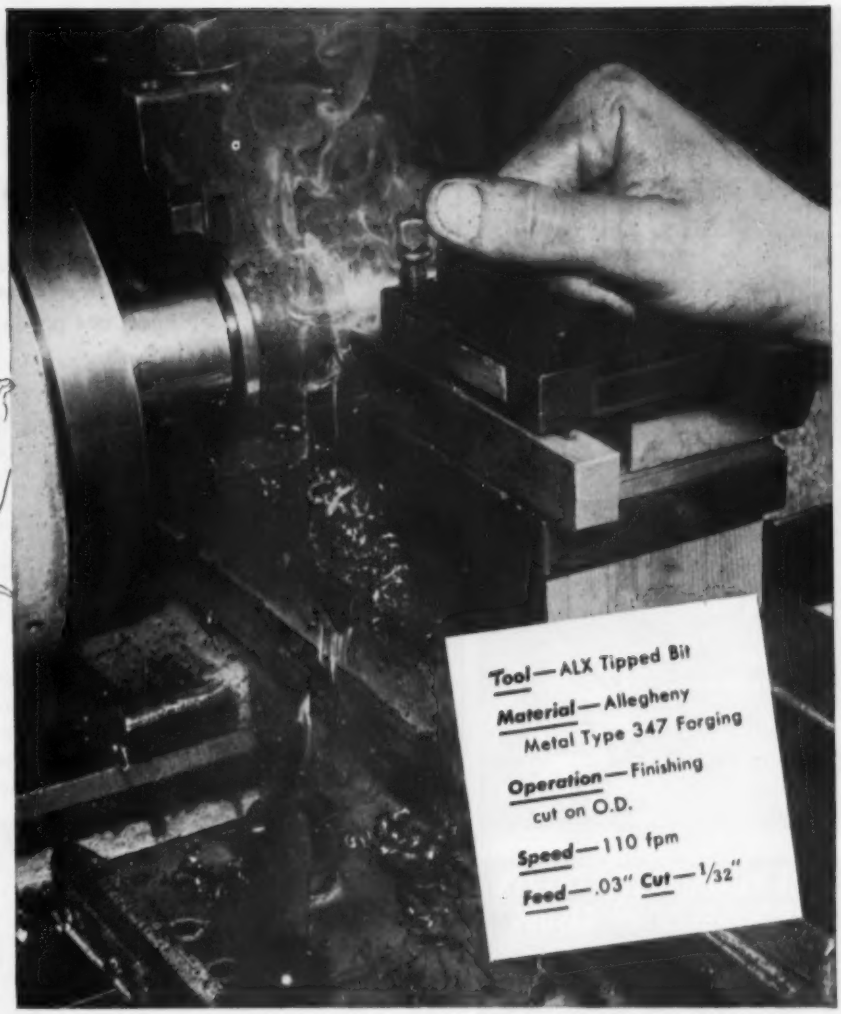
A copy is yours for the asking.

THE YODER COMPANY
5510 Walworth Avenue, Cleveland 2, Ohio

ELECTRIC-WELD TUBE MILLS • SLITTING LINES
COLD ROLL FORMING PRODUCTION LINES

ENGINEERING YODER MANUFACTURING

Want Faster Cutting? Fewer Grinds?



. . . then get ALX ALLOY Cutting Tools

Write for copy of

"ALX ALLOY TOOL BITS"

This new bulletin, just off the press, tells how you can effect production economies by using ALX for fast turning, boring, and facing operations in certain applications. Helpful information on analysis, properties and applications—includes grinding, tool angles, speeds and feeds, brazing of tips. *Write for your copy.*

ADDRESS DEPT. A-701

Many a machine shop—and probably yours—has jobs on which ALX Tipped Tools or ALX Solid Bits step up production by permitting increased speeds, feeds, and depths of cut. Resharpening is less frequent, the reason being special composition.

ALX is a cast-to-shape, non-ferrous, cobalt-base alloy containing chromium, tungsten, carbon, and boron. The as-cast hardness of 60-62 Rockwell C obviates later heat treatment. Tools stay sharp at accelerated speeds and higher temperatures. Speed range is above that of high-speed steel, but lower than with carbide. At such intermediate speeds, the superior performance of ALX results from toughness, red-hardness, edge-strength, and abrasion-resistance values combined.

An Allegheny Ludlum tool engineer can quickly point out the strategic spots to tool up with ALX. For this service, call A-L. ● *Allegheny Ludlum Steel Corp., Forging & Casting Division, Wanda & Jarvis Aves., Detroit 20, Mich.*

For complete **MODERN** Tooling, call

Allegheny Ludlum

W&D 5441

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FINE TOOL STEELS SINCE 1864

ULBRICH Stainless Steels

Immediate Delivery from Stock

STRIP · Flat Wire and other Stainless Steels

a foot or a pound and up to your EXACT requirements from the BIGGEST little Converting Mill in the country.

Complete Inventory

Phone: COlony 9-7771

Wallingford, Conn.

Established 1924

UNIT MACHINING COST CUT 17% ON THIS GRAY IRON CASTING

...thanks to

FERROCARBO®

Users everywhere report similar experiences. In fact, on 67 machining tests in 11 large machine shops, castings of gray iron treated with FERROCARBO averaged 89.5% greater machinability per tool than untreated castings. These premium castings are finer-grained, denser, stronger, yet they COST YOU NO MORE... because your foundryman, using FERROCARBO, makes worthwhile savings in raw material costs.

FOR FREE BOOKLET on FERROCARBO, citing actual case histories of faster machining, with longer tool life, write The Carborundum Company, Dept. 42, Niagara Falls, N.Y. 64-60

CARBORUNDUM®

TECHNICAL BRIEFS

FINISHING: Improved Polishing

Wheel composed of hundreds of pieces of cloth-coated abrasives replaces conventional methods, ups production . . . Wheels last longer.

A device for polishing all types of metal for plating, painting or architectural finishing without use of fine grit set-up wheels, rag or sisal buffs or brushes, is said to have cut polishing costs in one plant by one-fifth, and to have outlasted set-up wheels 60 to 1 in another plant.

Developed by Minnesota Mining & Mfg. Co., St. Paul, Minn., the device consists of hundreds of pieces of cloth-coated abrasives factory-formed into a wheel that can be used on rotary or straight line automatics, or on standard lathes for hand operations.

Removes Stock, Polishes

The wheel removes stock as part of its polishing action, thus can remove mild draw marks as it generates a buff-type finish. At a metal manufacturing plant, where the product is polished and buffed prior to plating, the wheels in a 220-240-320 grit sequence are producing an average 11,000 pieces per day before needing replacement. Thirteen of the wheels are now in operation, on a straight-line automatic machine.

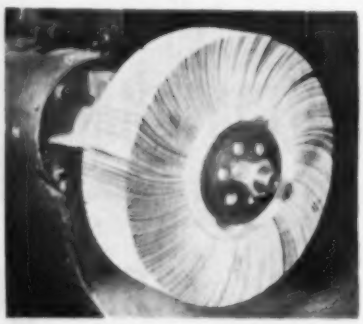
The new heads replace 20 heads using a combination of 12 set-up wheels and eight sisal buffs. Unit finishing cost was reduced one-fifth. Production was increased from 1800 to 2500 pieces to between 4000 and 4500 pieces per day. Finish is better too—4½ microinches, as against a finish of between 5½ to 6 microinches with the previous method.

Downtime Eliminated

At another plant, a grit 220 wheel on one lathe shaft and a grit 240 wheel on the other shaft are finishing more than 500 large pieces before wearing down—the amount of work it previously took 60 set-up wheels to do. And downtime is reported practically eliminated.

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 97. Just indicate the page on which it appears. Be sure to note exactly the information wanted.



New polishing wheel . . .

Fabrication:

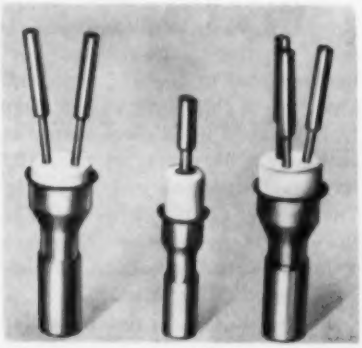
Tubing replaces rods, ends ceramic terminal cracking.

Cracking of ceramics in the manufacture of terminals for electric cables has been eliminated by Ceramaseal Co., New Lebanon Center, N. Y., by substituting thin wall tubing for solid metal rods.

Failures were occurring even though the coefficient of expansion of the rod metal virtually matched that of the ceramic. The slight difference was sufficient to cause stress cracks. But it was found that the thin wall tubing, made

from 42 pct nickel-iron alloy, could be inserted through holes in the ceramic terminals and soldered to give a hermetic seal without cracking the terminals.

Supplied by Superior Tube Co., Norristown, Pa., the cold drawn tubing yields enough to absorb the



No more cracking . . .

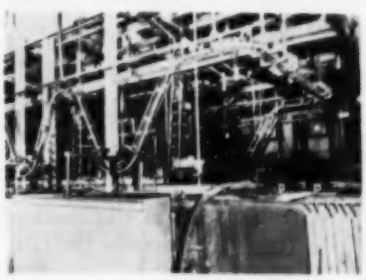
stresses resulting from slight differences in expansion. Cold-drawn to ± 0.001-in. OD and ± 10 pct wall—well within limits needed for a close fit to prevent seepage of excess solder—the tubing is purchased in eight sizes from 0.060-in. to 0.190-in. OD, with 0.005-in. wall in smaller sizes and 0.007-in. wall on larger sizes.

Handling:

Conveyor has shorter turning radius.

A conveyor recently installed for the D. L. Auld Co., Columbus, O., makes 18 vertical turns of only 12-in. radius plus four horizontal turns of 15-in. radius, in less than 80 ft of forward travel, without traction wheels, sprockets or other cornering mechanisms.

Short vertical turns get parts, suspended on special hangers to



Roller-coaster conveyor . . .

MACHINABILITY INDEX 80-90*

PEARLITIC MALLEABLE CASTINGS

*B1112 STEEL = 100

Low machinability index of 80-90 (B1112 steel = 100) is probably reason enough to warrant serious consideration for your product.

But pearlitic malleable castings—from National—don't stop there. They have great ultimate strength . . . resist wear under heavy loads at high speeds . . . make excellent non-seizing bearings . . . can be air or liquid-quenched . . . can be smooth-finished.

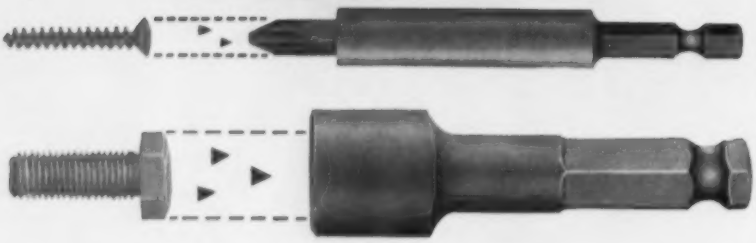
Don't overlook the advantages of pearlitic malleable. For pearlitic malleable castings—from National—can often reduce manufacturing costs, weight and assembly time . . . can increase the sales potential of your product. AA-1809

NATIONAL MALLEABLE AND STEEL CASTINGS COMPANY

Cleveland 6, Ohio

The Nation's largest independent producer of malleable and pearlitic malleable

an "extra hand" for your fastening operations!



*apex magnetic

nut running and screwdriving tools

*The small, powerful magnet in an Apex magnetic tool serves as an "extra hand" by holding the nut or screw firmly in position during the fastening operation. Even when working straight down, or in cramped areas, there's no time lost by awkward fumbling to start nuts or screws by hand.

With Apex nut running or screwdriving magnetic tools, the nut or screw stays just where it belongs—in the socket or on the tip of the bit. Apex magnetic tools are designed for use with power or manual tools. You can run hex or square nuts . . . you can drive Phillips, Frearson, Slotted, Clutch Head or Socket Head screws . . . and you can do it the quick, easy way that cuts fastening costs—with Apex magnetic tools.

Catalog 25 lists the complete line of Apex magnetic nut running and screwdriving tools. Write, on your company letterhead please, for your copy.

APEX TOOLS fastening tools

THE APEX MACHINE & TOOL CO.
1029 Patterson Blvd. • Dayton 2, Ohio

an overall depth of up to 34 in., in and out of a series of dip tanks only 6-ft long. The short horizontal turns avoid costly over-sized loops where parts shuttle through cleaning, drying and baking ovens.

Steel Rod Connectors

Simplified turning action of the Landahl Chainless Conveyor is made possible by the steel-rod connectors used in place of the usual chain or cable linkage between trolley units. Rods pivot freely at both ends, by means of specially hardened "ball and socket" joints. The ball is secured to the ends of the connector rods; the sockets are openings in the ends of the trolley housings.

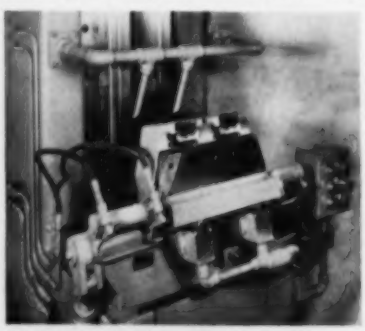
Trolley units consist of roller skate wheels mounted on individual axles spaced evenly around a cylindrical center housing at 12-in. intervals. They ride on angle-iron tracks suspended by C-shaped steel plates. Two tracks suffice for all straight horizontal travel. Auxiliary tracks are mounted above the wheels at turns.

Track and supports bolt together, simplifying conveyor installation or relocation.

Machining:

Slots broached at 360 per hour rate

The combination of efficient fixturing and machine precision allows the ordnance division of a leading timepiece manufacturer



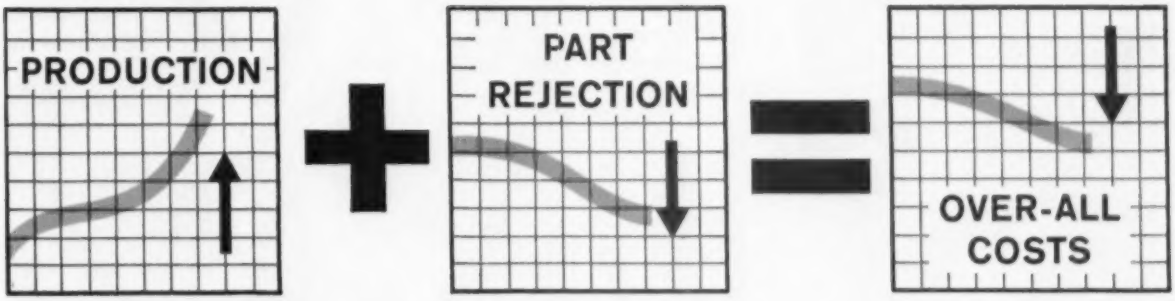
360 parts hourly . . .

to broach the final slot at the top of a firing pin housing at the rate of 360 per hour.

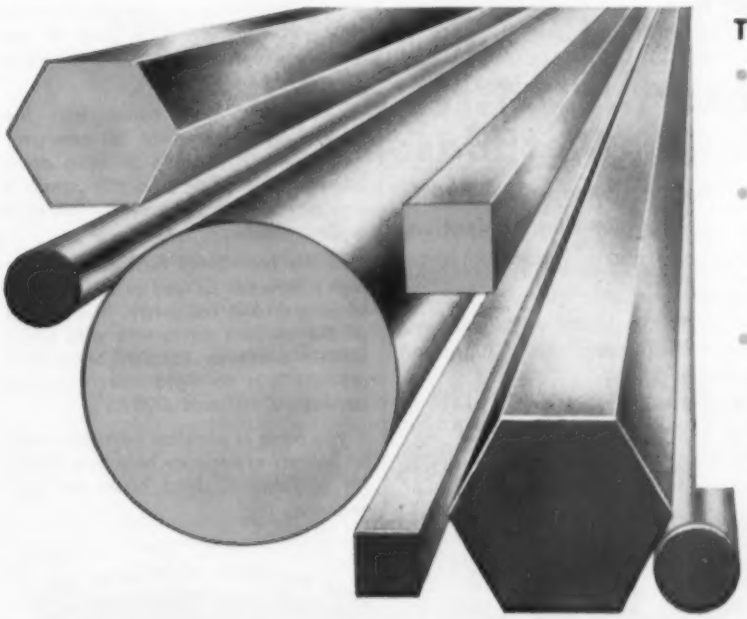
A model RP 6-36 ram press,

J&L cold drawn leaded steel bars work to your over-all cost advantage

HERE'S HOW:



...they're free cutting and available in both Bessemer and Open Hearth grades



These versatile steel bars offer:

- IMPROVED MACHINABILITY—because they enable you to use faster cutting speeds, to secure longer tool life and to produce superior surface finishes.
- GREATER UNIFORMITY—because they are completely J&L-produced from the basic raw materials to guarantee optimum uniformity so necessary for today's high-speed machining operations.
- HIGHEST QUALITY—because they must meet the rigid quality standards developed by J&L through years of leadership in the development and production of free-cutting steels.

Phone the nearest J&L District office or your Distributor today.

Jones & Laughlin
STEEL CORPORATION—*Pittsburgh*

J&L STEEL

MONEL•NICKEL•COPPER•ALLOYS
THIN STRIP

±.0004″ is run-of-the-mill

Typical of the care that assures absolute uniformity in all Somers THIN STRIP is this 4-high mill equipped with the latest electronic gages and controls. Here thickness is constantly checked throughout the run, and maintained within ±.0004″ or less on gages from .010″ down. The slightest variation may be instantly corrected.

No matter how exacting your requirements may be for thin strip metal, you can depend on Somers quality control, equipment and experience to guarantee uniform quality every time—all the time.

Somers Brass Company specializes in rolling nickel and its alloys from .020″, and copper and its alloys from .012″ both down to .00075″.

If you now have, or anticipate, a problem with exacting standards of this strip metal write:

FOR EXACTING STANDARDS ONLY
Somers

Somers Brass Company, Inc.
WATERBURY, CONN.

built by Colonial Broach & Machine Co., Detroit, is used for the job. The slot is 0.562-in. wide and 0.124-in. deep with tolerances being +0.004-in. in width and +0.001-in. in depth. The final slot must be at right angles to the two vertical slots on the circumference of the blank. These two slots are first straddle broached on a single ram machine.

Plunge Cut First

The plunge cut is made, then the sides of the slot are finished to size at the end of the cut.

The fixture for the ram press is hydraulically trunnioned up for loading two parts at a time. These are positively located with respect to the two slots already broached. Hydraulic cylinders position and clamp the parts in stationary nests so they are accurately aligned for the final broaching operation.

Automatic Cycling

Ten seconds are allotted for loading and unloading with a broaching speed of 30 ft/min to attain the production rate of 360 per hour.

The machine has automatic cycling, and both hydraulic and electrical controls are interlocked.

Methods:

Assembly-line layout boosts galvanizing production.

Metal parts move by overhead conveyor through pickle and rinse tanks before being galvanized at Quick Industries' new plant at Jackson, Mich.

Improved conveying methods and modern production line layout were developed with Hanson-Van Winkle-Munning Co., Mata-

Better conveying . . .

Somers
UNIGRAIN®
thin strip brass for deep drawing

Uniform fine grain size of Somers eyelet brass—less than .010 mm. (75X).

with
Fine Grain Finish

Somers Brass Company is pleased to announce the availability of a new, unique annealing process which makes possible a uniform fine grain of less than .010 mm. which can be drawn to full 40% elongation.

Developed in cooperation with the Selas Corp. of America this new process makes it possible to deep draw Somers THIN STRIP and still obtain a fine grain which is easily buffed to a brilliant finish.

And this new Selas Furnace provides high production as well as close control of temper and uniformity. It is typical of the modern equipment with which Somers produces copper, brass and other alloys to rigid specifications between .010″ and .00075″.

If you have a problem with thin strip, let Somers experience help you. Write for confidential data blank or field engineer.

FOR EXACTING STANDARDS ONLY
MONEL•NICKEL•COPPER•ALLOYS
THIN STRIP

Somers Brass Company, Inc.
WATERBURY, CONN.

At Detrex Corporation, Detroit, workman slips a snug fitting Johnson Bronze Bearing into place on the shaft of an idler arm of this compact Rotary Gyro Degreaser. Idler arms move in "ferris wheel" motion to rotate heavy baskets filled with parts to be degreased.

How Detrex Prevents A Maintenance Problem With Johnson Bearings

The Detrex Corporation, Detroit, manufactures a full line of unique, automatic degreasers, washers, drycleaning and other equipment to speed production, save time and money for many industries where removing oil and grease from parts and materials is a problem.

On the idlers of the totally enclosed Rotary Gyro Degreaser shown being assembled above, Johnson Bronze General Purpose Bearings give years of trouble-free service.

As a Detrex executive puts it: "When we sell a machine we want the customer to forget about shut-downs to repair some trivial part that's failed, so we design every part, choose every piece of material with one thought in mind: make it better to last longer. It's the reason we have specified Johnson Bronze General Purpose Bearings wherever bearings of this type will do the job."

Detrex depends upon a Johnson distributor in that area for service on their bearing requirements. They have found his stocks to be adequate to meet their requirements and know that even in emergencies the bearings they need will be delivered when they want them.

Johnson General Purpose Bearings are available from stock in over 900 sizes. Alterations such as oil grooves, slots, or holes are easily and quickly made. They are cast in Johnson's famous, high grade bearing bronze alloy No. 72. For complete information on prices and delivery, call your Johnson distributor. Johnson Bronze Co., 505 South Mill Street, New Castle, Pa.

Johnson Bearings

GRAPHITED
over 175 sizes

GENERAL PURPOSE
over 900 sizes

UNIVERSAL BRONZE BARS
over 400 sizes

LEDALOYL
over 400 sizes

ELECTRIC MOTOR
over 350 sizes

NON-FLUID OIL

TRADE MARK REGISTERED

Lubricates and Rust Proofs Pneumatic Tools!

Why tolerate worn, rusted pneumatic tools? Perfect lubrication, at any temperature, is provided with "NR" grades of NON-FLUID OIL which absorb moisture from compressed air to form a stable emulsion.

Get these "NR" (Non-Rust) NON-FLUID OIL extras:

- perfect lubrication
- complete protection against rusting
- no gumming or sticking
- tool speeds increased from 10% to 30%
- winter grade available with pour point of —30 °F.

Write for your free testing sample and see why it is approved by all leading manufacturers of air tools, and used by majority for initial run-in after assembly.

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NON-FLUID OIL is not the name of a general class of lubricants, but is a specific product of our manufacture.

"We've used that same headline every month since the plant started using Columbia EXTRA HEADER DIE!"

COLUMBIA TOOL STEEL COMPANY • CHICAGO HEIGHTS, ILL.

Producers of fine tool steels — All types immediately available through Sales Offices, Warehouses and Representatives in Principal Cities.

TOOL COLUMBIA STEELS

wan, N. J., manufacturer of metal-finishing equipment and supplies. Sheet assemblies, pipe coils, pole line hardware and water tanks are galvanized at rates of 2500-3000 lb per hr, twice Quick's former output.

Brighter Zinc Coatings

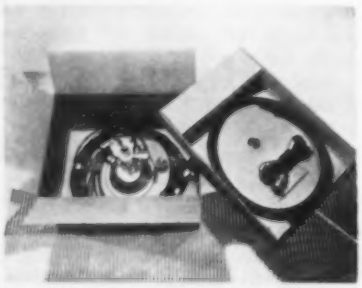
In addition, the company says it is preparing and pickling parts more effectively now and getting brighter zinc coatings as a result of improved processing.

Work is carried by electrically-operated hoists on a monorail through a sulfuric acid pickling bath, double rinse bath, flux wash and galvanizing dip.

Packaging:

Shipping box gives 2-way protection.

Lincoln Engineering Co., St. Louis, Mo., set two requirements for the shipping box for its new



Box is speedier packing . . .

automatic lubricating equipment: Firm support to prevent damage to moving parts and secure packing to avoid tangling of lubricant feed lines and electrical wiring.

Designed by Hinde & Dauch, Sandusky, O., the box selected has two interior packing pieces to hold the lubricating device firmly in place. One die cut pad is positioned in the bottom of the box and the Multi-Luber diaphragm is nested in the die cut. The other fits on top of the unit holding the tubing in place by pressure.

Its tray form provides place for other components to be fitted for safe shipment. Box construction facilitates rapid, efficient packing of the equipment.

Looking for a TOUGHER STEEL?

Unusually tough, even at sub-zero temperatures, Lukens "T-1" steel can reduce equipment costs.

Failure from abrasion or from impact can happen to the steel in your equipment, too. Here's the answer—the tougher steel you've been looking for. Lukens "T-1" steel has excellent resistance to the combination of wear and impact, is tough enough to withstand unusual stresses and pressures as well as shock at either sub-zero or high temperatures, thus lowering maintenance costs and lengthening equipment life.

Equipment builders will find that the techniques of working with this new steel are no different than with carbon steel. Lukens "T-1" steel can be fabricated not only in the shop but also in the field, through proper design procedures. Because of its high yield strength (over 90,000 psi) this new steel offers lighter weight and reduced thickness in comparison to heavier, thicker plates of carbon steel, thereby reducing material, fabrication and shipping costs. And Lukens' range of steel plate sizes—including the widest and heaviest plates available anywhere—makes possible additional savings for equipment builders through the use of wider plates that require fewer welded seams.

The latest addition to Lukens' complete line of carbon, alloy and clad steels, this quenched and tempered alloy plate steel's unusual combination of properties suit it especially to application in pressure vessels, bridges, shipbuilding, construction machinery and general industrial equipment. On problems of design, selection, application and fabricating techniques, Lukens offers full technical assistance. If you would like further information on Lukens "T-1" steel, write for the new 28-page Bulletin 781. Address: Manager, Marketing Service, 772 Lukens Building, Lukens Steel Company, Coatesville, Pa.

LUKENS

"T-1" STEEL

THE NEWEST IN A COMPLETE LINE OF ALLOY STEELS

LUKENS STEEL COMPANY, COATESVILLE, PENNSYLVANIA

NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies . . . for more data use the free postcard on page 97 or 98

Abrasive cut-off machine can be used wet or dry

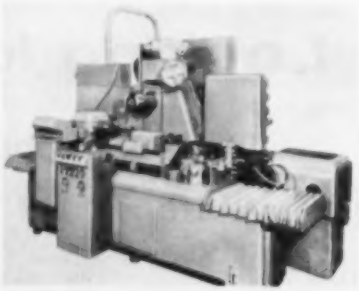
A new semi-automatic Bullard abrasive cutoff machine cuts solids up to 2½-in. diam, squares to 1¾-in., angles to 4-in. and tubing up to 4-in. O.D. Cut-off wheel is entirely enclosed, during upward cutting stroke, by a metal safety cover. Dual hydraulic clamping plates hold the material rigid on both sides of the cut. Double-acting hydraulic cylinders operate wheel travel, clamping plates and wheel cover. Machine may be used wet or dry. Motor and drive unit combination has a flywheel effect that keeps wheel speeds constant. *Lombard Governor Corp.*

For more data circle No. 33 on postcard, p. 97.

Gear grinders offer improved loading

Fully automatic gear grinding machines now available offer improved automatic loading, automatic rejection, automatic stock equalizer, automatic release of work pieces, automatic downfeed and automatic trimming. Other features include controlled flow of coolant through the grinding wheel single or double diamond trimmers, multi-ribbed grinding wheels, multiple fixed diamond trimmers and a time recorder attachment which accumulates the total machine cycle time for production control. *The Gear Grinding Machine Co.*

For more data circle No. 34 on postcard, p. 97.



Inspects stainless steel bars and tubing

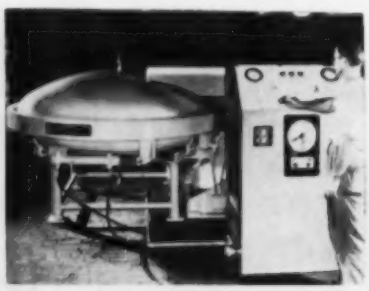
A new electronic testing equipment is now available for inspecting nonmagnetic stainless steel bars and tubing, both seamless and welded. An audiovisual warning system indicates external mechanical defects in bars, such as cracks, seams and slivers. In seamless and welded tubing, it indicates mechanical defects both on inside and outside diams, as well as imperfect welds. Differences in chemical composition and cross-sectional dimensions are also detected by the new electronic testing machine. A meter and oscilloscope supplement the audiovisual warning system to give more complete information. Speed of the testing equipment is about 200 feet per minute. *Magnetic Analysis Corp.*

For more data circle No. 35 on postcard, p. 97.

Autoclaves offer full automatic operation

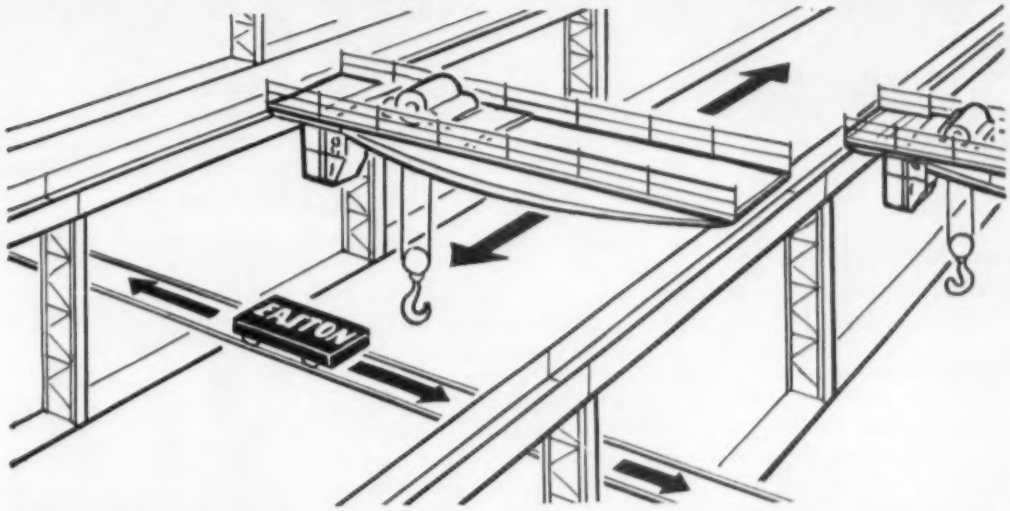
Fully automatic autoclaves now available maintain constant preset temperature during all their cycles and provide a written record of each complete cycle. Timer, heat control, cycling control, air control, water control, steam control and opening and closing mechanisms are all completely automatic. Autoclave lid is hydraulically operated, and is raised, lowered and locked according to the preset cycle upon which the machine is operating. Pushbutton automatic controls enable one man and a helper to operate a bank of up to eight autoclaves. *Philips & Davies, Inc.*

For more data circle No. 36 on postcard, p. 97.



USE YOUR IMAGINATION WITH

Cross-Bay® Transfer Cars



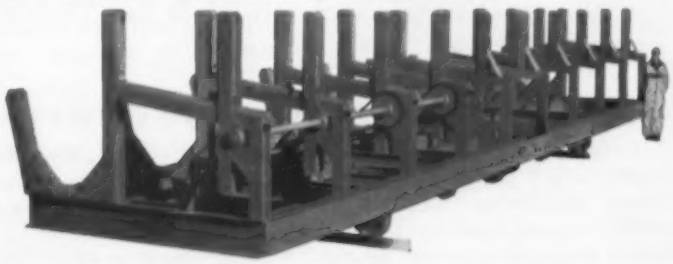
Infinitely variable application of EASTON motor-driven Cross-Bay Cars, together with the possibility of special super-structure design, provides full scope for imaginative planning in this growing era of automatic handling.

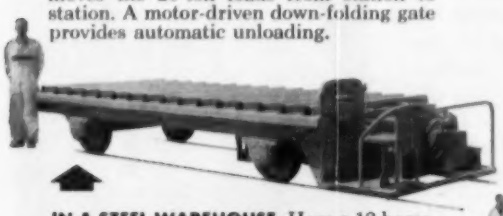
EASTON Cross-Bay Transfer Cars were originally introduced to supplement overhead crane service in modern parallel bay plants and for movement of materials between plant buildings, storage yards and shipping platforms. Operating men everywhere were quick to see the adaptability of the Cross-Bay idea to many other heavy handling and production problems.

EASTON Cross-Bay Cars, controls and special superstructures are custom-designed to meet individual requirements. Customers may specify electric motor, storage battery, gasoline-electric or gasoline-hydraulic power. Controls may be manual, electric (by push-button on the car or remote station) or electronic. EASTON Cross-Bay Cars can be built to capacities from 5 to 500 tons to fit any track gauge.

Investigate the EASTON Cross-Bay idea now for plant expansion and new plant programs.

IN A TUBE MILL. An interesting application of mechanized superstructure. Here several lengths of brass tubing are carried in a special superstructure on an EASTON Cross-Bay Car. The 2 horsepower electro-fluid drive, controlled from a walk-along push-button station on the side of the car, moves the 20-ton loads from station to station. A motor-driven down-folding gate provides automatic unloading.





IN A STEEL WAREHOUSE. Here a 12 horsepower gasoline-hydraulic EASTON Cross-Bay Car handles 25 ton loads of structural shapes in a steel warehouse. A comfortably seated driver operates the car at speeds up to 50 ft. per minute forward or reverse between plant buildings.

IN A STEEL MILL. Here a push-button control panel is attached by a 10 ft. cable to a 100-ton capacity 3 horsepower electro-fluid EASTON Cross-Bay Car. As the operator walks along the car follows carrying two 50 ton slabs of steel.

A-1047

OTHER EASTON CUSTOM-BUILT CARS FOR INDUSTRY

Annealing Furnace Cars	Motor Driven Cars	Scoop Cars
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Core Oven Cars	Platform Cars	Steel Mill Cars
Gable Bottom Cars	Quarry Cars	Transfer Cars
Hopper Cars	Rack Cars	Transformer Cars
Mine Cars	Rocker Dump Cars	Turntables

FORTY-ONE YEARS OF DEPENDABLE SERVICE IN THE DESIGN AND MANUFACTURE OF INDUSTRIAL TRANSPORTATION EQUIPMENT

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EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA.

Flash butt welder takes tubing to 2-in. OD

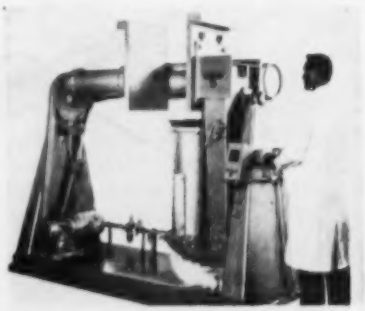
Model BMW1-150 Flash Butt Welder for welding aluminum to copper tubing for all types of refrigeration, and for welding aluminum or copper round stock similar to overhead trolley line, is announced. The welder, which meets military spec requirement MIL-W-6873, can weld tubing of 2-in. OD in mild steel, medium forging grade steel, and aluminum and copper alloys. Machine specs include clamp force adjustable to 18,000-lb, clamp stroke adjustable from ½ to 2-in., and upset force adjustable to 20,000-lb. The 150 kva unit is for 220 or 440 v operation. Secondary voltage is adjustable in 32 steps from 1.1 to 9.3 v. *Sciaky Bros., Inc.*

For more data circle No. 37 on postcard, p. 97.

Shell core blower

A shell core blowing machine, Model MCM-6, is designed for core boxes up to 18 by 30 by 12-in. across the parting line, and can be altered to accommodate core boxes to 36-in. long. Core box halves mount on electrically-heated cast iron plates, which are opened and closed by electric gear motors. Sand blows into the box under pressure and the unit is then inverted to return excess sand to the blowhead. After a short period, core box opens and the finished core is removed. Fully mechanized for pushbutton control, the machine is built for operation by one unskilled worker. Machine stands 7-ft high, rests on a 3 by 8½-ft base. *Shallway Corp.*

For more data circle No. 38 on postcard, p. 97.



Dewpoint indicator measures moisture in gases

For measurement of moisture in gases, a new, portable, manually operated dewpoint indicator is designed for applications where only periodic checks of dewpoint are desired. The indicator determines moisture content of a gas by measuring temperature at which the moisture begins to condense and is said to be especially useful for monitoring the moisture content of furnace atmospheres in the heat treatment of metals. It gives accurate readings over the range of dewpoint temperatures from ambient to −100 F, or 0.0003 pct moisture by volume in air. Operates on self-contained battery. *General Electric Co.*

For more data circle No. 39 on postcard, p. 97.

Optical contour grinder produces from line drawings

A surface grinder with hydraulic tracer control coupled with 30-in. screen comparator will produce profile ground shapes directly from a line drawing as well as duplicate finished ground profiles by automatic tracer control. The machine is made up of two basic elements. One is a special surface grinder equipped with the hydraulic tracer control; the other, a 30-in. screen comparator arranged for visual and manual control of the grinding wheel from a contour chart. Grinding wheel is 14-in. OD by 4-in. ID by ¼-in. thick. All necessary points are automatically lubricated. *Jones & Lamson Machine Co.*

For more data circle No. 40 on postcard, p. 97.

Feed rate meter reads speed at a glance

A new feed rate meter accurately reads speed of travel of cutting tools, carriages, and heads in low speed turning, boring or grinding operations. Speed rates, from a fraction of an inch per minute up to 5-, 10- and 20-ipm, are read at a glance directly from the large calibrated dial. Provision can be made for use of a remote indicator or one indicator can be used with any number of pickups. Indicator operates at 110 to 117 v, 60 cycles, and draws 30 watts power. *Electronic Specialties Div., Maico Co.*

For more data circle No. 41 on postcard, p. 97.

How to make short work of a long finishing job

Fast? A Fostoria Radiant Oven heats at the speed of light . . . requires no warm-up . . . bakes out a finish in a fraction of the time required by convection ovens.

You save space—cut costs to the nub—improve product quality. Read the Tinnerman case history at the right.

- **Cuts drying time 74%**
- **Tinnerman Products, Inc. makes fasteners —by the millions.**
- **Before Fostoria was called in, parts were finished in two fuel-fired batch ovens with great waste in time and motion.**
- **Two Fostoria Radiant Ovens cut drying time from 30 to 8 minutes—freed one worker for other tasks—improved work conditions.**

Savings like this may be possible in your operation. Call your Fostoria Sales Engineer for the complete story. There is no obligation!

Write today for informative booklet "Applications Unlimited"

INFRA-RED fostoria SYSTEM

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THE FOSTORIA PRESSED STEEL CORPORATION, Dept. 1024, Fostoria, Ohio

TOOL WEAR...-75%
MACHINING SPEED...+100%
ON THIS GRAY IRON RING

...thanks to
FERROCARBO®

Users everywhere report similar experiences. In fact, on 67 machining tests in 11 large machine shops, castings of gray iron treated with FERROCARBO averaged 89.5% greater machinability per tool than untreated castings. These premium castings are finer-grained, denser, stronger, yet they COST YOU NO MORE... because your foundryman, using FERROCARBO, makes worthwhile savings in raw material costs.

FOR FREE BOOKLET on FERROCARBO, citing actual case histories of faster machining, with longer tool life, write The Carborundum Company, Dept. 43, Niagara Falls, N.Y. 60-43

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PRODUCTION
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ONE OF THE
NATION'S LARGEST
AND MOST MODERN
PRODUCTION
FOUNDRIES

ESTABLISHED 1866
THE WHELAND
COMPANY
CHATTANOOGA 2, TENN.

Hydraulic vise

A hydraulic vise, No. 1004, is controlled by two simple foot pedals, one for power, the other for release. Both the operator's hands are free for handling, positioning. The stop control is adjustable so

that the vise grips and holds production work with a single power stroke. The new hydraulic power pump employs a recently-developed replaceable cartridge which can be removed and replaced as a unit. Vise closing speed is 1¼-in. per pump stroke. Full vise opening can be accomplished in 4 seconds. Maximum hydraulic pressure is 7000 psi, maximum jaw pressure 4000-lb. Safety valve protects against overloading. *The Columbian Vise & Mfg. Co.*

For more data circle No. 42 on postcard, p. 97.

Protective coating

An easily-applied primer, called Rustbond Primer #6, has a drying time of 10 minutes at 85°F, permitting faster scheduling and better utilization of painting crews. It can be used over wirebrushed, rusty steel, sandblasted steel and clean cold-rolled steel, and applies at a dry film thickness of 2 mils with a coverage of 230 sq ft per gallon. It shows excellent resistance to alkalies and acids and good resistance to solvents, and is said to improve topcoat performance of maintenance vinyls, phenolics, alkyds, chlorinated rubbers, one package neoprenes, oil-base paints and furans. *Carboline Co.*

For more data circle No. 43 on postcard, p. 97.

Cleansing solvent

A new highly efficient cleansing solvent called C-I-SOL has cleansing properties closely resembling carbon tetrachloride but is up to 20 times less toxic. Useful with complete safety for most industrial applications, the non-flammable solvent is recommended for removing grease, wax, oil and tars from metal products, hand tools, machine tools and components, sheet metal, tubing, etc. Though not suitable for vapor degreasing, it is adapt-

able to cold cleaning, dip cleaning and bucket cleaning. *Chem Industrial Co.*

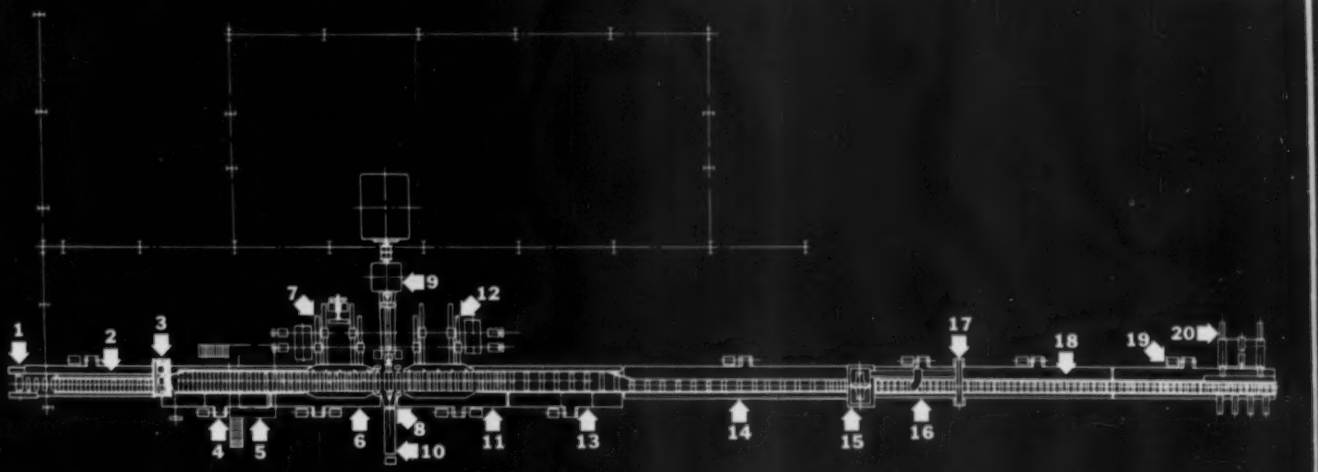
For more data circle No. 44 on postcard, p. 97.

Industrial wipers

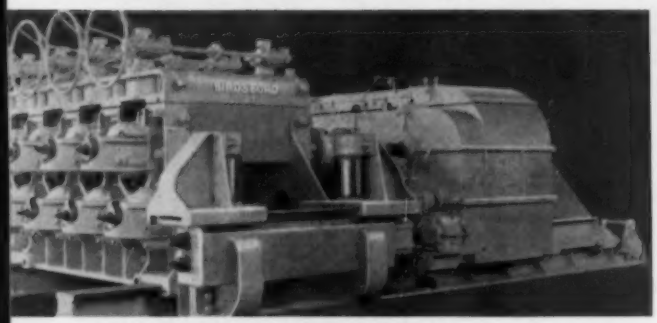
Recently developed, a new type of disposable industrial paper wiper, said to be ideal for machine shop use, consists of two sheets of pa-

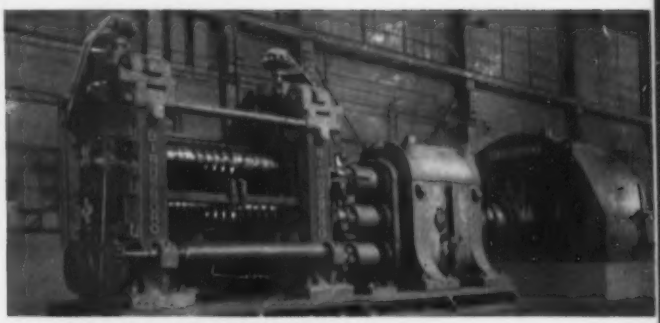
per joined together through a special process to give thorough cleaning action and maximum dirt retention. Chemical treatment creates all-important wet strength. Product is packaged in "pop-up" boxes which make another wiper instantly available as one is removed. *Scott Paper Co.*

For more data circle No. 45 on postcard, p. 97.

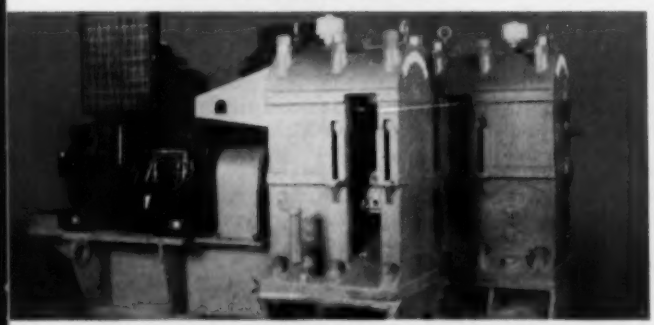


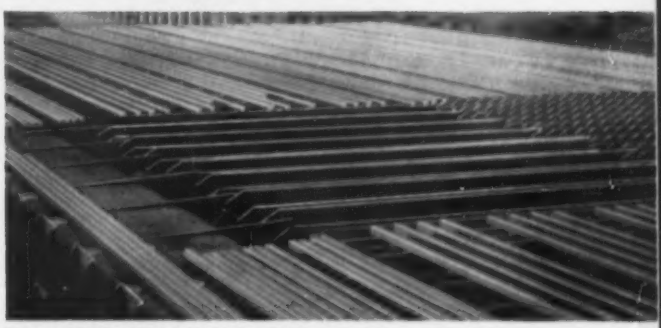
FROM COMPLETE MILLS . . . such as this 32" blooming mill layout





TO STRAIGHTENERS . . . . . TO ROUGHING MILLS





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STEEL MILL MACHINERY
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BIRDSBORO STEEL FOUNDRY & MACHINE CO., BIRDSBORO, PENNA. Offices in Birdsboro, Pa. and Pittsburgh, Pa.

(Advertisement)

What's New

IN STEEL FROM STOCK

In the news today are many developments of interest to those who specify, buy or work with steel. Ways in which you can raise efficiency and lower costs in your operations may be suggested by the following summary.

Leaded plates—Now lead has been added to E-Z-Cut plate. As a result, E-Z-Cut, which was already considered one of the best free-machining plates on the market, is better than ever. Tests show that New E-Z-Cut cuts even faster, takes a sounder weld and polishes to a better finish than non-leaded E-Z-Cut. And because sulphur content is much lower, New E-Z-Cut is much cleaner steel, free from sulfide stringers. First stocks include thicknesses up through 3".

Biggest stainless steel plates now available from Ryerson stocks. This is the first time that 96" wide plates in thicknesses up to and including 1"—and heavier plates in 80" widths have been carried in stock at plants from coast to coast. Types on hand: 304, 304L, 316 and 316L. Next time, save welding on your big jobs with these bigger plates.

Delivered prices on tubing—Something new in simplified pricing is featured in a booklet just published by Ryerson. For buyers in the 16 metropolitan areas where large Ryerson tubing stocks are located, the booklet gives total delivered prices. There's no figuring to do—no factors to add. For buyers outside these metropolitan areas, a separate book gives prices per 100 feet and transportation charges. And beside every price in all books is a figure that tells you quickly and clearly when you can get a lower price by ordering just a few feet or pounds more. Copies on request.

Give steel-walled buildings a new look with stainless steel siding in mansard pattern, now available for quick shipment from Ryerson. (Galvanized and carbon steel sheets in mansard pattern also available.) The mansard pattern of widely spaced corrugations makes an unusually attractive wall and loss in total sheet area from pattern formation is slight—only about the same as with 2½" corrugated—previously the most economical pattern you could use. Maintenance-free stainless in mansard pattern also has many industrial and miscellaneous-architectural-ornamental applications. New Bulletin 70-5 on request.

New sizes of leaded alloys—Increasing demand for New Rycut 50, fastest machining .50 carbon alloy steel, has prompted Ryerson to increase the range of sizes in stock. Hot rolled rounds, both annealed and heat treated, are now available in large sizes—up through 9½". So heavy shafting, gears, cams, etc. can be produced at savings possible only with Rycut alloys.

Stainless pipe for welding applications—Now there's no need to wait for mill deliveries or to use expensive stabilized types when you want stainless pipe suitable for welding. Type 304L pipe, an extra low carbon type that eliminates the need for stress relieving after welding, has recently been added to Ryerson stocks. Size range: Schedule 40 welded pipe in commonly used sizes from ¼" through 2". Schedule 40 seamless in 3", 4" and 6" pipe sizes.

Supply situation on bars, structurals, plates and sheets—Heavy demand makes it difficult to keep all sizes of these products always on hand. However, we do have thousands of tons of steel ready for quick shipment and, since our stocks are being replenished continually, sizes that are not available today may be on hand tomorrow. So call us next time you need steel.

RYERSON CERTIFIED STEELS

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BIRDSBORO STEEL FOUNDRY & MACHINE CO., BIRDSBORO, PENNA. Offices in Birdsboro, Pa. and Pittsburgh, Pa.

The Iron Age SUMMARY . . .

Mills trying to control flow of incoming business . . . But orders continue to exceed capacity to produce . . . Steel output sets new weekly record.

Holding It Down . . . Steel producers are wielding a big blue pencil in an all-out effort to control the flow of incoming orders. But new business continues to exceed the mills' ability to produce. And backlogs are mounting.

The boom has reached the point where going mill prices are becoming academic for many consumers. To fill the gaps in their inventories, more and more steel customers are turning to warehouses and steel brokers.

Warehouses are turning away some business in order to accommodate their regular customers. And the steel brokers are cleaning up on odd lots that ordinarily would sell at below-market prices. Some consumers are buying steel of better quality than they normally use.

Expensive conversion deals are growing. But a shortage of ingots due to the close balance of melting and finishing capacity is keeping conversion pretty much under control. Nevertheless, some big consumers are devoting a lot of time and talent to searching out conversion steel sources.

It's Fantastic . . . The surging demand for steel is almost fantastic. If the mills wanted to open the flood gates, they could book orders for most of 1956. As it is, their first-half output is in the bag, even though orders are not being booked beyond the first quarter.

In fact, it now looks as though most mills will "drop out" one month in first quarter as a means of cutting down on their backlogs and catching up with their delivery promises. This will help but will not solve the problem.

A survey by THE IRON AGE indicates that all major steel consuming industries will be in the market strong in 1956. Their production goals are high, and they will be trying to rebuild depleted inventories. At the moment, steel stocks are down to rock bottom in many companies.

Freight Car Problem . . . Most pressure is coming from the auto industry, where producers are shooting for a 7-million-car model year.

Another problem confronting steel producers and their customers is lack of freight cars. This is likely to worsen. Tied in with it is the tough battle freight car builders and railroads are having in lining up requirements for new cars and car repairs.

Steel production this week is estimated at 98.5 pct of capacity, off from last week's 98.9 pct. A new weekly record of 2,386,000 tons was set.

Steel Output, Operating Rates

	This Week	Last Week	Month Ago	Year Ago
Production (Net tons, 000 omitted)	2,370	2,386	2,341	1,809
Ingot Index (1947—1949=100)	147.5	148.5	145.5	112.5
Operating Rates				
Chicago	97.5	98.5*	97.0	78.5
Pittsburgh	102.0	102.0	99.0	73.0
Philadelphia	103.0	103.0*	98.0	64.0
Valley	99.0	100.0*	97.0	70.0
West	96.2	91.3*	94.0	82.5
Detroit	95.0	98.0	94.0	97.5
Buffalo	105.0	105.0	105.0	87.5
Cleveland	102.0	105.0*	102.0	82.0
Birmingham	94.0	97.5	96.0	71.0
S. Ohio River	90.0	86.0*	85.0	85.0
Wheeling	103.0	104.0*	100.0	86.0
St. Louis	97.0	106.0	88.0	84.0
Northeast	97.0	92.0*	97.0	46.0
Aggregate	98.5	98.9	97.0	75.0

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.174	5.174	5.174	4.798
Pig Iron (Gross Ton)	$59.09	$59.09	$59.09	$56.59
Scrap, No. 1 hvy (gross ton)	$44.50	$44.83	$44.17	$33.33
Nonferrous				
Aluminum ingot	24.40	24.40	24.40	22.20
Copper, electrolytic	43.00	43.00	43.00	30.00
Lead, St. Louis	15.30	15.30	15.30	14.80
Magnesium, ingot	33.25	33.25	33.25	27.75
Nickel, electrolytic	64.50	64.50	64.50	63.08
Tin, Straits, N. Y.	96.50	96.125	96.75	92.375
Zinc, E. St. Louis	13.00	13.00	13.00	11.50

STEEL PRODUCT MARKETS

Raise Carbon Plate Price

Latest $6 a ton price hike may prelude industry-wide move . . . Higher material, labor costs make it tough for producers to hold price lines . . . Market still tight.

◆ CARBON PLATE price increases by several producers may or may not become an industry-wide move. But it points up the fact that some mills are finding that higher raw material and labor costs are making it tough to hold the price line.

It also recalls that steel producers generally are talking more about the need for higher prices to: (1) build better profits, (2) finance expansion, and (3) attract more equity capital through better profit showing.

Lukens Steel Co. took the lead in advancing carbon plate prices $6.00 a ton to $4.80 per cwt., as against the earlier level of $4.50 per cwt. A follow-up to the move came through from Claymont Div. of Colorado Fuel & Iron Corp.

In explaining the price hike on carbon plate at this time, Lukens notes that, "substantial raw material price increases, and specifically on scrap, over the past several months, have made necessary the price revision on the carbon steel products in which these increases are a major factor in the cost of manufacture."

Overall, the current squeeze play of outstripping consumer demand for such tight mill products as hot and cold-rolled sheet, light and heavy gage plate, and wide-flange and standard structurals continues unabated in all market areas.

Many mills, in order to get deliveries in better shape next year, will drop either October, November, or December—with the likelihood of similar action extending over into the early months of next year. In general, consumers, especially the big ones such as the automakers, are still pressing for all the steel they can get. Mill "catch up" months can help in a limited way.

SHEETS AND STRIP . . . Extended fourth quarter carryover periods and talk by the mills of dropping the month of January as a "catch up" time on delayed deliveries is still noticeable in **Chicago**. Carryovers on sheet, according to the mills, will run anywhere from four to six weeks—in some instances a few weeks longer. These will roll right along into the early months of next year. "Dropping" January won't help in producers' efforts to become anywhere near current on sheet and strip. Most mills have yet to open for first quarter '56, but in effect they're already booked solid. Expected fourth quarter carryovers will tighten delivery patterns just that much more. In the **East**, one major producer is currently taking first quarter orders on hot, cold-rolled and galvanized. Expects first quarter demand to be just as heavy, perhaps a bit stronger, than in the last half of this year. Delivery promises are currently running 4 to 6 weeks behind. In **Pittsburgh**, an eight weeks carryover is expected to lop over from fourth quarter into first quarter on hot and cold-rolled sheet and strip. About 60 pct of first quarter orders will represent carryover, it's estimated, leaving 40 pct of production for new orders. Mills in **Detroit** are either going to have to cut back sheet allotments in first quarter or wash out a month. Demand from all quarters continues unabated.

Purchasing Agent's Checklist:

APPLIANCES: Sales soar . . . . p. 38

STEEL: Tinplate holds record pace . . . . . p. 39

LOCOMOTIVES: Boom hits builders . . . . . p. 40

BARS . . . A recent major mill breakdown in **Pittsburgh** helped slow down bar delivery in the area by about two weeks. Carryover of all sizes and grades of bars going into first quarter is expected to be at least six weeks. This leaves about 60 pct of production for new orders. In the **East**, one major producer is scheduling bar delivery on a month-to-month basis for first quarter, is working on January now. Current deliveries are running about 2 to 4 weeks in arrears. Another large **eastern** producer has yet to open 1st quarter order books on any major products, including bars, expects to do so in about 10 days. **Chicago** cold-finishers can give 4 to 8 week delivery on special finish and cold-drawn bars. Alloy and leaded steel bars are booked up to March. **Detroit** bar producers haven't opened for 1st quarter yet. Orders are pouring in, however, and most producers are holding off on first quarter as long as they can in an effort to eliminate a lot of false delivery promises.

PLATES . . . Both light and heavy gage plates are running 6 to 7 weeks behind on 4th quarter delivery patterns for one large **eastern** producer. Expects a carryover of at least this many weeks going into 1st quarter '56. **Detroit** reports plate is still the toughest item for area consumers with little betterment in the situation expected for months to come. Carryovers of at least 10 weeks are expected in **Pittsburgh** going into 1st quarter.

STRUCTURALS . . . **Chicago** reports carryovers on wide-flange beams and standards may run 30 to 60 days into 1st quarter, with a strong possibility of further cuts on allotments at the turn of the year. In **Pittsburgh**, carryovers of 10 weeks or better are expected going into 1st quarter, with very little new tonnage being made available to consumers during that period. In the **East**, 4th quarter structural deliveries run 4 weeks late.

BOLTS AND NUTS . . . A revised pricing system for nuts, bolts and other fasteners—first major change in basic list prices since 1927—was put into effect last week by major producers. The new system represents no major increase or decrease but eliminates plus and minus discounts. The new system is the result of a long-time study and survey by the Industrial Fasteners Institute of Cleveland.

Comparison of Prices

(Effective Oct. 25, 1955)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Oct. 25 1955	Oct. 18 1955	Sept. 27 1955	Oct. 26 1954
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.325¢	4.325¢	4.325¢	4.05¢
Cold-rolled sheets	5.325	5.325	5.325	4.95
Galvanized sheets (10 ga.)	5.85	5.85	5.85	5.45
Hot-rolled strip	4.325	4.325	4.325	4.05
Cold-rolled strip	6.29	6.29	6.29	5.82
Plate	4.52	4.52	4.52	4.225
Plates wrought iron	9.30	9.30	9.30	9.30
Stainl's C-R strip (No. 302)	44.50	44.50	44.50	41.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$9.05	$9.05	$9.05	$9.05
Tinplate, electro (0.50 lb.)	7.75	7.75	7.75	7.75
Special coated mfg. ternes	7.85	7.85	7.85	7.85
Bars and Shapes: (per pound)				
Merchant bars	4.65¢	4.65¢	4.65¢	4.30¢
Cold finished bars	5.90	5.90	5.90	5.40
Alloy bars	5.65	5.65	5.65	5.075
Structural shapes	4.60	4.60	4.60	4.25
Stainless bars (No. 302)	38.25	38.25	38.25	35.50
Wrought iron bars	10.40	10.40	10.40	10.40
Wire: (per pound)				
Bright wire	6.25¢	6.25¢	6.25¢	5.75¢
Rails: (per 100 lb.)				
Heavy rails	$4.725	$4.725	$4.725	$4.45
Light rails	5.65	5.65	5.65	5.35
Semifinish Steel: (per net ton)				
Rerolling billets	$68.50	$68.50	$68.50	$64.00
Slabs, rerolling	68.50	68.50	68.50	64.00
Forging billets	84.50	84.50	84.50	78.00
Alloy blooms, billets, slabs	96.00	96.00	96.00	86.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.025¢	5.025¢	5.025¢	4.675¢
Skelp	4.225	4.225	4.225	3.90
Finished Steel Composite: (per pound)				
Base price	5.174¢	5.174¢	5.174¢	4.798¢

	Oct. 25 1955	Oct. 18 1955	Sept. 27 1955	Oct. 26 1954
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$63.69	$63.69	$63.69	$61.19
Foundry, Valley	59.00	59.00	59.00	56.50
Foundry, Southern, Cin'ti	62.93	62.93	62.93	60.43
Foundry, Birmingham	55.00	55.00	55.00	52.88
Foundry, Chicago	59.00	59.00	59.00	56.50
Basic, del'd Philadelphia	62.77	62.77	62.77	60.27
Basic, Valley furnace	58.50	58.50	58.50	56.00
Malleable, Chicago	59.00	59.00	59.00	56.50
Malleable, Valley	59.00	59.00	59.00	56.50
Ferromanganese‡, cents per lb.	9.50¢	9.50¢	9.50¢	9.50¢
‡ 74-76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig iron	$59.09	$59.09	$59.09	$56.59
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$44.50	$44.50	$44.50	$34.50
No. 1 steel, Phila. area	46.50	46.50	46.50	32.00
No. 1 steel, Chicago	*42.50*	43.50	43.50	33.50
No. 1 bundles, Detroit	39.00	39.00	39.00	26.50
Low phos., Youngstown	49.00	49.00	47.50	35.50
No. 1 mach'y cast, Pittsburgh	50.50	49.50	46.50	42.50
No. 1 mach'y cast, Philadel'a	47.50	47.50	47.50	42.50
No. 1 Mach'y cast, Chicago	*52.50*	53.50	53.50	43.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	*$44.50*	44.83	44.83	33.33
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$13.25	$13.25	$13.25	$14.38
Foundry coke, prompt	16.25	16.25	16.25	16.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	43.00	43.00	43.00	30.00
Copper, Lake, Conn.	43.00	43.00	43.00	30.00
Tin, Straits, New York	96.50†	96.125	96.75	92.375
Zinc, East St. Louis	13.00	13.00*	13.00	11.50
Lead, St. Louis	15.30	15.30	15.30	14.80
Aluminum, virgin ingot	24.40	24.40	24.40	22.20
Nickel, electrolytic	64.50	64.50	64.50	63.08
Magnesium, ingot	33.25	33.25	33.25	27.75
Antimony, Laredo, Tex.	33.00	33.00	33.00	28.50
† Tentative. ‡ Average. * Revised.				

Finished Steel Composite
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite
Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite
Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on P. 128→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	60.50	61.00	61.50	62.00	.....
Birdsboro, Pa. *B6*	60.50	61.00	61.50	62.00	.....
Birmingham *R3*	54.50	55.00*	.....	.....	.....
Birmingham *W9*	54.50	55.00*	59.00	.....	.....
Birmingham *U4*	54.50	55.00*	59.00	.....	.....
Buffalo *R3*	58.50	59.00	59.50	.....	.....
Buffalo *H1*	58.50	59.00	59.50	.....	.....
Buffalo *W6*	58.50	59.00	59.50	60.00	.....
Chester *C17*	60.50	61.00	61.50	.....	.....
Chicago *I4*	58.50	59.00	59.00	59.50	.....
Cleveland *A5*	58.50	59.00	59.00	59.50	63.50
Cleveland *R3*	58.50	59.00	59.00	.....	.....
Daingerfield *L3*	55.00	55.00	.....	.....	.....
Duluth *I4*	58.50	59.00	59.00	59.50	.....
Erie *I4*	58.50	59.00	59.00	59.50	.....
Everett *M6*	.....	61.00	61.50	.....	.....
Fontana *K1*	64.50	65.00	.....	.....	.....
Geneva, Utah *C7*	58.50	59.00	.....	.....	.....
Granite City *G2*	60.40	60.90	61.40	.....	.....
Hubbard *Y1*	.....	.....	59.00	.....	.....
Lone Star *L3*	.....	55.00	.....	.....	.....
Minnequa *C6*	60.50	61.00	61.50	.....	.....
Monessen *P6*	58.50	.....	.....	.....	.....
Neville Is. *P4*	58.50	59.00	59.00	.....	.....
N. Tonawanda *T1*	.....	59.00	59.50	.....	.....
Pittsburgh *U1*	58.50	.....	.....	59.50	.....
Sharpsville *S3*	58.50	59.00	59.00	59.50	.....
So. Chicago *R3*	58.50	.....	59.00	.....	.....
Steelton *B3*	60.50	61.00	61.50	62.00	66.50
Swedeland *A2*	60.50	61.00	61.50	62.00	.....
Toledo *I4*	58.50	59.00	59.00	59.50	.....
Troy, N. Y. *R3*	60.50	61.00	61.50	62.00	66.50
Youngstown *Y1*	.....	.....	59.00	59.50	.....

DIFFERENTIALS: Add, 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional, 0.25 pct nickel. *Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo, *H1*, $68.75; Jackson, *J1*, *G1*, $67.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	301	302	303	304	316	321	348	410	416	430
Ingots, rerolling	17.75	19.00	—	20.25	31.50	25.00	33.75	15.00	—	15.25
Slabs, billets, rerolling	22.25	24.75	26.75	26.00	40.25	32.00	43.00	19.50	—	19.75
Forg. discs, die blocks, rings	—	—	—	—	—	—	—	—	—	—
Billets, forging	31.75	32.00	34.75	33.75	51.25	38.25	51.00	25.50	26.00	26.00
Bars, wires, structurals	38.00	38.25	41.00	40.25	60.75	45.25	60.00	30.50	31.00	31.00
Plates	40.00	40.25	42.75	43.00	64.00	49.25	64.75	31.75	33.00	32.25
Sheets	44.25	44.50	—	47.25	68.25	54.25	73.50	36.25	—	36.75
Strip, hot-rolled	32.00	34.50	—	37.25	58.25	44.25	59.75	—	—	—
Strip, cold-rolled	41.00	44.50	—	47.25	68.25	54.25	73.50	36.25	—	36.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; McKeesport, Pa., *U1*; Washington, Pa., *W2*, *J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Ft. Wayne, *J4*; Philadelphia, *D5*.

Strip: Midland, Pa., *C11*; Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Middletown, O., *A7*; Harrison, N. J., *D3*; Youngstown, *C5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (.25¢ per lb higher); *W1* (.25¢ per lb higher); New Bedford, Mass., *R6*.

Bar: Baltimore, *A7*; Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*; Ft. Wayne, *I4*; Philadelphia, *D5*; Detroit, *R5*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*.

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Philadelphia, *D5*.

Forged discs, die blocks, rings: Pittsburgh, *C11*; Syracuse, *C11*; Farndale, Mich., *A3*; Washington, Pa., *J2*.

Forgings billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R5*.

Prices Sag in Chicago

Only electric furnace grades withstand general weakening . . . Break called temporary . . . Other areas report prices holding . . . Composite off 33¢.

◆ CHICAGO prices are down. No. 1 heavy melting is off $1. Turnings look particularly weak. Even railroad grades are off. Only electric furnace holds firm in the Chicago district.

Elsewhere, the picture is largely unchanged. Turnings are off in Detroit. Steelmaking grades are showing good strength in New York. But in the main, it is a question of holding prices and moderate activity.

Openhearth scrap continues to stand still in Pittsburgh despite heavy steel production. Increased generation of home scrap and greater use of hot metal are reasons advanced for market doldrums. Philadelphia reports brisk activity and firm prices. There has been little inventory build-up in the area and brokers see no reason for any price weakness.

On the basis of the drop in Chicago, THE IRON AGE Composite for No. 1 heavy melting steel scrap moved down 33¢ to $44.50.

Pittsburgh . . . The absence of major openhearth scrap purchases continues to hold prices in line. Steel ingot production in the area is at the highest level this year, well above capacity rates. However, increased generation of home scrap, side deals, abundance of industrial scrap, top hot metal production, and the increased use of railroad and other premium grades have enabled the mills to stay out of the market for No. 1 heavy melting scrap. Very small tonnages of No. 1 heavy melting have been reported moving between $45 to $47. The quantities involved and the special characteristics of the orders are insufficient to establish new prices. Increased activity of railroad grades has jumped prices of rails, with 2 ft rails up $3 to $60 per ton on latest sales. Specialties are up 50¢ a ton. No. 1 machinery cast and heavy breakable cast are also up another $1. Blast furnace grades are unchanged.

Chicago . . . Chicago prices have slipped, with only electric furnace grades showing real strength. Turnings are particularly weak but even railroad grades slipped on new mill buying. The current break is regarded as strictly temporary, and is expected to be offset by a price rise shortly after the beginning of November. Small purchases at the bottom of the spread were made by local consumers.

Philadelphia . . . Top steelmaking and blast furnace grades are holding steady in the face of a currently strong, active market. For the most part, brokers and dealers are expecting little softening in present price ranges in the immediate days ahead. Cast grades continue strong with a reported $1 advance showing up in cupola cast, effecting a $2 spread in this grade. Some additional strength in railroad specialities is reflected in a $1 advance in short rail crops. Dealers report yard activity moving at a good pace with little build up in inventory. Export activity continues steady with prices for most grades holding about equal to the domestic level.

New York . . . As expected, continued heavy buying by both domestic consumers and foreign purchasers has raised prices on steelmaking grades by $1 in this area to a top of $42.50 for No. 1 steel. Also reflecting continued strong demand, cast grades have risen 50¢ to $1, depending on grade.

Detroit . . . The regular end-of-the-month lull hit the Detroit market this week with both dealers and brokers waiting for the new auto lists. Predictions are that blast furnace grades will be a little weaker and openhearth grades will stay about the same when the lists close. In the meantime, borings and turnings dropped $1 on the basis of latest sales.

Cleveland . . . Several Valley purchases last week confirmed present prices on steelmaking grades. New sales are expected this week at the same or slightly higher prices in the Valley. One Valley mill bought small tonnage No. 2 bundles at $1 under market at $36 and No. 2 heavy melting at $41. One lot of railroad tonnage sold to Valley mill recently commanded only very slight profit, indicating some weakness. In Cleveland area, closing of automotive lists of over 20,000 tons this week will be bellwether for next months market.

Birmingham . . . Electric furnace scrap continues to be the most active of all grades in this market. Dealers were busy filling orders for openhearth received earlier this month and little new buying was evident. The supply area for cast iron grades is shortening and most of this cast is from short freight areas. Consumers, however, doggedly maintain steady prices, considering any increase would be uneconomical in the light of pig iron prices.

St. Louis . . . A list of 125 cars of No. 1 railroad heavy melting by the MOPAC was readily taken at unchanged prices, and other items on the list are unchanged. The movement to the St. Louis industrial district has been good but the mills have been consuming scrap as fast as received. For fear that the winter may halt collection of scrap iron, mills are accepting all scrap iron that is offered.

Cincinnati . . . Market is quiet with no major buys and no offerings to brokers at lower prices. Area traders awaiting monthly price announcement from major consumer in area due end of this week. Local mill may also buy. Foundry business continues strong with no price fluctuations.

Buffalo . . . Prices are unchanged here. Major mills have done no new buying. Operating rates continue high and entry of the mills for tonnage orders is expected soon.

Boston . . . Prices are unchanged here. Market activity is moderate. Export is still a factor. Domestic buying continues at a steady pace.

West Coast . . . Prices are holding after a second rise this month. But the same tug-of-war is still on—mills forced to buy against very heavy exporting. Some eight cargoes are scheduled out of Los Angeles alone by year-end.

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Scrap Prices *(Effective Oct. 25, 1955)*

Pittsburgh

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles	44.00 to 45.00
No. 2 bundles	37.00 to 38.00
Machine shop turn.	30.00 to 31.00
Mixed bor. and ms. turns.	30.00 to 31.00
Shoveling turnings	33.00 to 34.00
Cast iron borings	33.00 to 34.00
Low phos. punch'gs, plate	49.00 to 50.00
Heavy turnings	42.00 to 43.00
No. 1 RR. hvy. melting	48.00 to 49.00
Scrap rails, random lgth.	54.00 to 55.00
Rails 2 ft and under	59.00 to 60.00
RR. steel wheels	53.00 to 54.00
RR. spring steel	53.00 to 54.00
RR. couplers and knuckles	53.00 to 54.00
No. 1 machinery cast.	50.00 to 51.00
Cupola cast.	42.00 to 43.00
Heavy breakable cast.	40.00 to 41.00

Chicago

No. 1 hvy. melting	$42.00 to $43.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 factory bundles	46.00 to 47.00
No. 1 dealers' bundles	42.00 to 43.00
No. 2 dealers' bundles	32.00 to 34.00
Machine shop turn.	27.00 to 28.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	28.00 to 29.00
Cast iron borings	28.00 to 29.00
Low phos. forge crops	52.00 to 53.00
Low phos. punch'gs, plate	49.00 to 50.00
Low phos. 2 ft and under	48.00 to 49.00
No. 1 RR. hvy. melting	48.00 to 49.00
Scrap rails, random lgth.	55.00 to 56.00
Rerolling rails	64.00 to 66.00
Rails 2 ft and under	60.00 to 61.00
Locomotive tires, cut	51.00 to 52.00
Cut bolsters & side frames	53.00 to 54.00
Angles and splice bars	57.00 to 58.00
RR. steel car axles	56.00 to 57.00
RR. couplers and knuckles	51.00 to 52.00
No. 1 machinery cast.	52.00 to 53.00
Cupola cast.	47.00 to 48.00
Heavy breakable cast.	40.00 to 41.00
Cast iron brake shoes	38.00 to 39.00
Cast iron car wheels	46.00 to 47.00
Malleable	57.00 to 58.00
Stove plate	38.00 to 39.00

Philadelphia Area

No. 1 hvy. melting	$46.00 to $47.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles	46.00 to 47.00
No. 2 bundles	37.00 to 38.00
Machine shop turn.	28.50 to 29.50
Mixed bor. short turn.	28.50 to 29.50
Cast iron borings	28.50 to 29.50
Shoveling turnings	30.00 to 31.00
Clean cast chem. borings	35.00 to 36.00
Low phos. 5 ft and under	48.00 to 49.00
Low phos. 2 ft and under	49.00 to 50.00
Low phos. punch'gs	49.00 to 50.00
Elec. furnace bundles	47.00 to 48.00
Heavy turnings	42.00 to 43.00
RR. steel wheels	51.00 to 52.00
RR. spring steel	51.00 to 52.00
Rails 18 in. and under	59.00 to 60.00
Cupola cast.	41.00 to 43.00
Heavy breakable cast.	45.00 to 46.00
Cast iron car wheels	51.00 to 52.00
Malleable	58.00 to 59.00
Unstripped motor blocks	29.00 to 31.00
No. 1 machinery cast.	47.00 to 48.00

Cleveland

No. 1 hvy. melting	$45.00 to $46.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 bundles	45.00 to 46.00
No. 2 bundles	36.00 to 37.00
No. 1 busheling	45.00 to 46.00
Machine shop turn.	25.00 to 26.00
Mixed bor. and turn.	29.00 to 30.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Cut struct'r'l & plates, 3 ft & under	48.50 to 49.50
Drop forge flashings	42.00 to 44.00
Low phos. punch'gs, plate	44.00 to 45.00
Foundry steel, 2 ft & under	47.50 to 48.50
No. 1 RR. heavy melting	48.50 to 49.50
Rails 2 ft and under	61.00 to 62.00
Rails 18 in. and under	62.00 to 63.00
Railroad grate bars	37.00 to 38.00
Steel axle turnings	30.00 to 31.00
Railroad cast.	49.00 to 50.00
No. 1 machinery cast.	49.00 to 50.00
Stove plate	45.00 to 46.00
Malleable	51.00 to 52.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting	$47.50 to $48.50
No. 2 hvy. melting	41.00 to 42.00
No. 1 bundles	47.50 to 48.50
No. 2 bundles	37.00 to 38.00
Machine shop turn.	25.00 to 26.00
Shoveling turnings	30.00 to 31.00
Cast iron borings	30.00 to 31.00
Low phos. plate	48.50 to 49.50

Buffalo

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 busheling	39.00 to 40.00
No. 1 bundles	39.00 to 40.00
No. 2 bundles	32.00 to 33.00
Machine shop turn.	27.00 to 28.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Low phos. plate	45.00 to 46.00
Scrap rails, random lgth.	47.00 to 48.00
Rails 2 ft and under	52.00 to 53.00
RR. steel wheels	48.00 to 49.00
RR. spring steel	48.00 to 49.00
RR. couplers and knuckles	48.00 to 49.00
No. 1 machinery cast.	43.00 to 44.00
No. 1 cupola cast.	40.00 to 41.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$38.50 to $39.50
No. 2 hvy. melting	31.00 to 32.00
No. 1 bundles, openhearth	38.50 to 39.50
No. 2 bundles	27.00 to 28.00
New busheling	38.50 to 39.50
Drop forge flashings	38.00 to 39.00
Machine shop turn.	20.00 to 21.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	23.00 to 24.00
Low phos. punch'gs, plate	38.50 to 39.50
No. 1 cupola cast.	40.00 to 41.00
Heavy breakable cast.	34.00 to 35.00
Stove plate	35.00 to 36.00
Automotive cast.	43.00 to 44.00

St. Louis

No. 1 hvy. melting	$38.50 to $39.50
No. 2 hvy. melting	36.00 to 37.00
No. 1 bundles	40.00 to 41.00
No. 2 bundles	31.50 to 32.50
Machine shop turn.	27.00 to 28.00
Cast iron borings	28.00 to 29.00
Shoveling turnings	28.00 to 29.00
No. 1 RR. hvy. melting	46.00 to 47.00
Rails, random lengths	52.00 to 53.00
Rails, 18 in. and under	59.00 to 60.00
Locomotive tires uncut	59.00 to 60.00
Angles and splice bars	50.00 to 51.00
Std. steel car axles	49.00 to 50.00
RR. specialties	50.00 to 51.00
Cupola cast.	46.00 to 47.00
Heavy breakable cast.	35.00 to 36.00
Cast iron brake shoes	37.00 to 38.00
Stove plate	38.00 to 39.00
Cast iron car wheels	47.00 to 48.00
Malleable	48.00 to 49.00
Unstripped motor blocks	37.00 to 38.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 bundles	36.00 to 37.00
No. 2 bundles	27.50 to 28.00
No. 1 busheling	36.00 to 37.00
Elec. furnace, 3 ft & under	38.50 to 39.50
Machine shop turn.	19.00 to 20.00
Mixed bor. and short turn.	22.00 to 23.00
Shoveling turnings	23.00 to 24.00
Clean cast chem. borings	20.00 to 21.00
No. 1 machinery cast.	31.00 to 32.00
Mixed cupola cast.	29.00 to 30.00
Heavy breakable cast.	32.00 to 33.00
Stove plate	28.00 to 29.00
Unstripped motor blocks	18.00 to 19.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$41.50 to $42.50
No. 2 hvy. melting	36.00 to 37.00
No. 2 bundles	33.00 to 34.00
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	21.00 to 22.00
Shoveling turnings	22.00 to 23.00
Clean cast chem. borings	24.00 to 25.00
No. 1 machinery cast.	38.00 to 39.00
Mixed yard cast.	37.00 to 38.00
Charging box cast.	37.50 to 38.50
Heavy breakable cast.	37.00 to 38.00
Unstripped motor blocks	24.00 to 25.00

Birmingham

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy melting	35.00 to 36.00
No. 1 bundles	38.00 to 39.00
No. 2 bundles	28.00 to 29.00
No. 1 busheling	38.00 to 39.00
Machine shop turn.	26.00 to 27.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	17.00 to 18.00
Electric furnace bundles	42.00 to 43.00
Bar crops and plate	46.00 to 47.00
Structural and plate, 2 ft	45.00 to 46.00
No. 1 RR. hvy. melting	43.00 to 44.00
Scrap rails, random lgth.	52.00 to 53.00
Rails, 18 in. and under	58.00 to 59.00
Angles & splice bars	54.00 to 55.00
Rerolling rails	57.00 to 58.00
No. 1 cupola cast.	47.50 to 48.50
Stove plate	44.50 to 45.50
Charging box cast.	30.00 to 31.00
Cast iron car wheels	38.00 to 39.00
Unstripped motor blocks	36.00 to 37.00
Mashed tin cans	15.00 to 16.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$42.00 to $43.00
No. 2 hvy. melting	35.50 to 36.50
No. 1 bundles	42.00 to 43.00
No. 2 bundles	33.00 to 34.00
Machine shop turn.	28.50 to 29.50
Mixed bor. and turn.	24.00 to 25.00
Shoveling turnings	31.50 to 32.50
Cast iron borings	25.00 to 26.00
Low phos. 18 in. & under	50.00 to 51.00
Rails, random lengths	53.00 to 54.00
Rails, 18 in. and under	60.00 to 61.00
No. 1 cupola cast.	46.00 to 47.00
Hvy. breakable cast.	41.00 to 42.00
Drop broken cast.	50.00 to 51.00

San Francisco

No. 1 hvy. melting	$39.00
No. 2 hvy. melting	37.00
No. 1 bundles	39.00
No. 2 bundles	33.00
No. 3 bundles	29.00
Machine shop turn.	18.00
Cast iron borings	18.00
No. 1 RR. hvy. melting	39.00
No. 1 cupola cast.	45.00

Los Angeles

No. 1 hvy. melting	$39.00
No. 2 hvy. melting	37.00
No. 1 bundles	39.00
No. 2 bundles	33.00
No. 3 bundles	29.00
Machine shop turn.	18.00
Shoveling turnings	21.00
Cast iron borings	18.00
Elec. furn. 1 ft and under	39.00
No. 1 RR. hvy. melting	39.00
No. 1 cupola cast.	45.00

Seattle

No. 1 hvy. melting	$42.00
No. 2 hvy. melting	38.00
No. 2 bundles	34.00
No. 3 bundles	30.00
No. 1 cupola cast.	40.00
Mixed yard cast.	40.00

Hamilton, Ont.

No. 1 hvy. melting	$38.50
No. 2 hvy. melting	35.50
No. 1 bundles	38.50
No. 2 bundles	32.50
Mixed steel scrap	32.50
Bushelings	33.50
Bush., new fact. prep'd	36.50
Bush., new fact. unprep'd	32.50
Machine shop turn.	16.00
Short steel turn.	25.50
Mixed bor. and turn.	$16.00 to 17.00
Rails, rerolling	47.50
Cast scrap	42.00 to 45.00

■ Size for size, Ohio Magnets lift larger loads over longer periods because they *operate cooler*. So for extra magnet lifting power, extra magnet value—always specify Ohio Magnets and Ohio Magnet Controllers. There's a type and size for every lifting job.

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Ohio Bolted Magnets 12" to 65" diameter. 6-coil types in 39" to 65"; 8-coil in 55" and 65". Strap copper coils over 39". Bolts protected in recessed wells. Also capsule coil over 45".

Ohio Welded Magnets 39" to 65" diameter. Lightweight models in 39" and 45". 6-coil types in 46", 55", 65"; 8-coil in 55" and 65". Welded on top where it can't get dented in. Also capsule coil over 45".

Ohio Basket Magnets 55" and 65" 4-coil, and 65" 6-coil. For extra heavy-duty service; hefty ears project beyond magnet diameter, ward off damaging blows. No weight carried by bolts. Also capsule coil over 45".

Ohio also makes
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Heavy-Duty Electric Hoists,
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Shell and Torque Motors,
Precision Threaded Parts for
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Ohio ELECTRIC

Chester Bland
President

NONFERROUS MARKETS

Zinc Price Holds

An attempt to boost price of Prime Western zinc fails . . . Producers who held the line force others back in less than a week . . . Copper export eased.

◆ AFTER SEVERAL DAYS of confusion, the zinc market has finally settled down—for Prime Western grade metal at least.

Trouble started last week when two major producers hiked prices half a cent to 13.50¢ per lb, East St. Louis basis. Other producers held the price line, refusing to follow suit, and very little business was booked at the higher price. Last Friday the higher price was withdrawn, and the Prime Western price is again unanimous at 13.00¢ per lb, East St. Louis.

But the price status of Special High Grade zinc is still murky. American Smelting & Refining Co. last week raised the premium for this grade ¼¢ to 1.75¢ per lb over the Prime Western price. One other seller almost immediately followed the AS&R lead, and on Friday, New Jersey Zinc Co. also upped its Special High Grade premium, effective Dec. 1. But at press time, four other producers are still quoting the old premium of 1.50¢ per lb.

The rise in the special high grade has not come as much of a surprise in trade circles. The move has been under discussion for some time. Special High Grade has been very tight in recent months, and some in the industry have been advocating the price boost as a means of increasing supplies. It seems safe to assume that the remaining producers will also boost the premium in the near future.

The American Die-Casting Institute vigorously protested the attempt to raise Prime Western prices, but so far has not commented on the premium grade hike.

Government regulations for exporting some copper materials are easing slightly, but rules covering aluminum exports are being tightened.

Under the new procedures, exporters are no longer required to submit evidence of availability and the name of foreign consumers with applications to export copper scrap, copper-base alloy scrap, copper-base alloy ingots, or refined copper; or foreign origin produced in this country under toll or conversion agreements.

Applications to export copper produced in the U. S. under toll or conversion agreements must still be accompanied by certification. Special requirements remain in effect for exports of unrefined and refined copper of domestic origin.

Applications for exports of aluminum scrap under the quantitative quota now in effect must be accompanied by evidence of availability.

In addition, application covering leaded aluminum foil scrap will not be charged against the fourth quarter export quota when evidence is supplied that the foil is commercially unsalable in this country. And scrap containing 70 pct or less aluminum will be charged against the quota only on the basis of the net weight of the aluminum alloy.

Distribution among exporters of the copper and aluminum quotas will continue to be made on the historical basis.

COPPER . . . Prices appear to have reached a temporary plateau. Biggest news last week was the drop in brass and bronze ingot prices. Cuts ranged from 1¢ to 3.50¢ per lb. depending on copper content. Smelters called the cut an attempt to pass on to customers benefit of lower scrap prices.

In the 85-5-5-5 group, price reductions ranged from 1.00¢ to 2.00¢ per lb. In 88-10-2, one grade, No. 242, was unchanged, while others were cut, some by as much as 3.50¢ per lb. All prices in the 80-10-10 group dropped 1.00¢, while yellow ingot price cuts ranged from 1.00¢ to 2.00¢ per lb. Nickel-silver grades were unchanged, manganese-bronze grades were marked down 2.00¢ to 2.50¢ a pound and silicon-bronze cuts ran as much as 2.50¢ per lb.

Demand for copper remains strong. Domestic producers have more orders than copper at the 43¢ price. Some custom smelters are sold out for November delivery. These firms have not yet opened order books for December. Other smelters say they are sold out through the end of the year. Producers would like to get more 43¢ copper to build up their LIFO position, but just can't get it. Brass and wire mills are trying a new gimmick as a result of the current LIFO situation: buying scrap copper at 37½¢ for No. 2 wire copper scrap. This is roughly equivalent to 43¢ for refined copper, and the mills hope it will have the same effect as the regular metal in replacing low-cost copper in inventory.

The outlook now, according to Wall Street reports is, barring labor troubles: domestic crude copper output will average about 105,000 tons a month for the balance of the year. Output in 1956 should be slightly higher.

But consumption, held back by the shortage, is likely to average about 130,000 tons monthly. The difference of 25,000 tons per month will have to be made of imports. And the price of imported copper will depend on European demand and Chilean control.

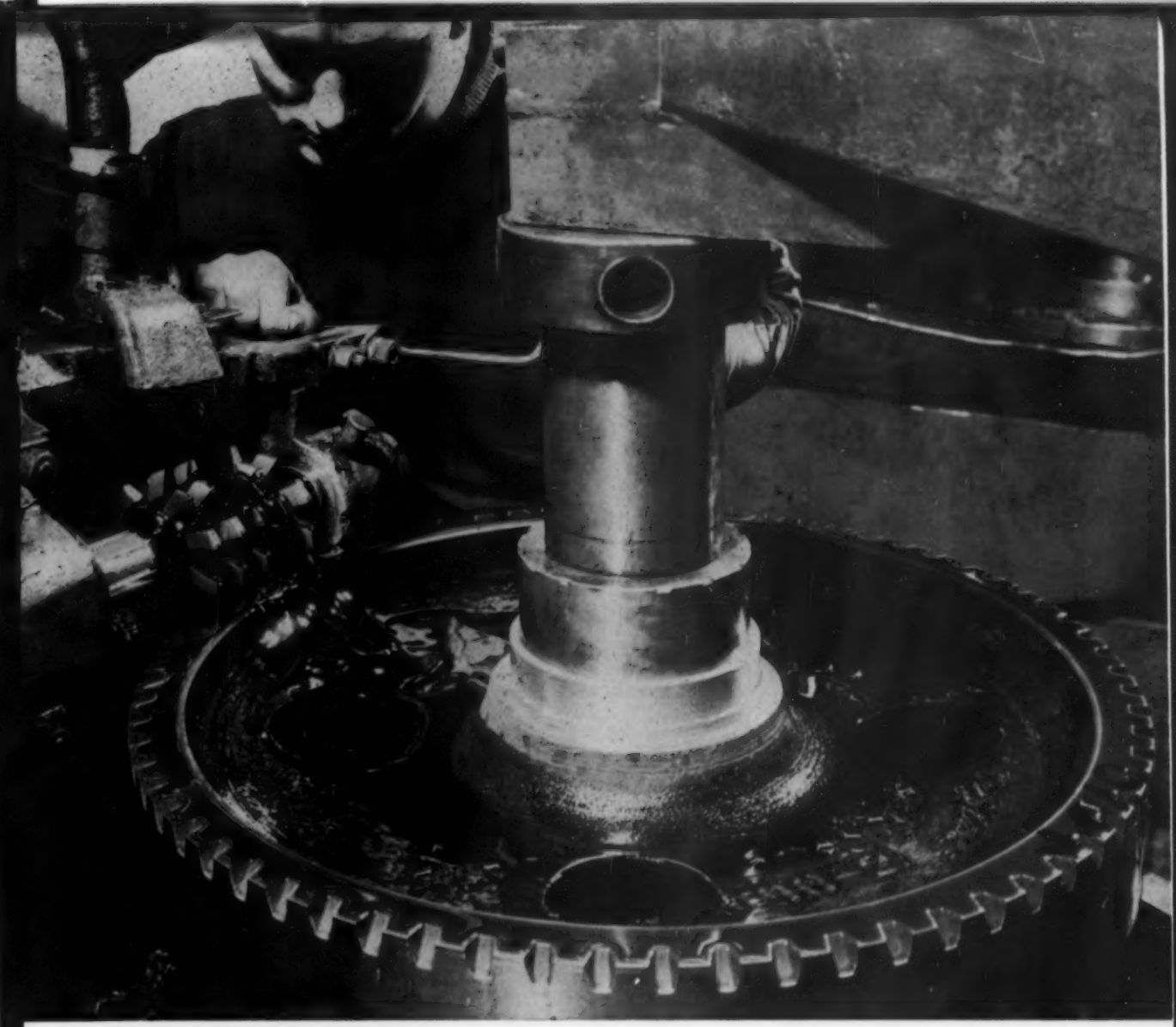
Consumers are being advised by a Wall St. broker to buy copper in the futures market now.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Oct. 19	Oct. 20	Oct. 21	Oct. 22	Oct. 24	Oct. 25
Copper, electro, Conn.	43.00	43.00	43.00	43.00	43.00	43.00
Copper, Lake, delivered	43.00	43.00	43.00	43.00	43.00	43.00
Tin, Straits, New York	96.125	96.125	96.125	....	96.50	96.50*
Zinc, East St. Louis	13.25†	13.25†	13.25†	13.00	13.00	13.00
Lead, St. Louis	15.30	15.30	15.30	15.30	15.30	15.30

*Note: Quotations are going prices. †Average producers quote either 13.00 or 13.50. *Tentative.*



Pittsburgh Gear switched to SSW forged blanks... saved 50 minutes machining time, extended cutter life 20%

Switching to SSW forged steel gear blanks in manufacturing mine locomotive drive gears has given Pittsburgh Gear Company, Neville Island, Pa. . . .

- **savings of 50 minutes in machining time.**
- **better performance through extended service life (cutter life increased 20%).**
- **reduced cutter costs.**
- **over-all lower initial cost.**

These benefits are a result of the more uniform internal structure and close dimensional tolerances of Standard Steel blanks. Machining is done on a single setup, at a maximum speed because there's no danger of hard spots and sand porosity as with castings.

Pittsburgh Gear knows their product must take extra-rugged wear in mining operation. In service the continuous starting and stopping of mine locomotives subjects drive gears to severe shock and impact. The denser core and uniform structure of these SSW blanks contribute to longer-lasting, failure-proof life of these gears.

Like Pittsburgh Gear, you can improve your product and cut your costs with SSW forgings. Write today for the new Standard Steel folder on forged weldless rings and flanges. Use the coupon now.

Standard Steel Works Division

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Dept. B516, Standard Steel Works Division
Baldwin-Lima-Hamilton Corporation, Burnham, Pa.

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Nonferrous Prices *(Effective Oct. 25, 1955)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136–.249	.250–3.
1100, 3003....	40.8	38.7	37.5	36.5
5052.....	48.3	43.4	41.7	39.9
6061-0.....	45.4	41.2	39.4	39.3

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6–8.....	41.6–43.2	56.6–60.2
12–14.....	42.3–43.7	57.5–61.6
24–26.....	45.3–45.7	67.7–72.1
36–38.....	53.6–54.2	90.5–94.3

Screw Machine Stock—2011-T-3

Size*	¾	⅝–⅞	⅜–1	1⅛–1½
Price	54.5	53.4	52.1	50.1

Roofing Sheet, Corrugated

(Per sheet, 26" wide, base, 16,000 lb)

Length* →	72	96	120	144
.019 gage.....	$1.295	$1.727	$2.160	$2.590
.024 gage.....	1.615	2.162	2.692	3.232

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: FS1-O ¼ in., 61¢; 3/16 in., 62¢; ½ in., 61¢; 0.064 in., 78¢; 0.032 in., 99¢. Specification grade higher. Base, 30,000 lb.

Extruded Round Rod: FS, diam ⅛ to 0.311 in., 82.5¢; ⅜ to ¾ in., 65¢; 1¼ to 1.749 in., 60.5¢; 2½ to 5 in., 57¢. Other alloys higher. Base up to ⅝ diam, 10,000 lb; ⅝ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: FS. In weight per ft for perimeters less than size indicated: 0.10 to 0.11 lb, 3.5 in., 70.7¢; 0.22 to 0.25 lb, 5.9 in., 66.9¢; 0.50 to 0.59 lb, 8.6 in., 63¢; 1.8 to 2.59 lb, 19.5 in., 60.8¢; 4 to 6 lb, 28 in., 57.7¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: FS, 0.049 to 0.057 in. wall thickness: OD ⅛ to 5/16 in., $1.625; 5/16 to ⅜ in., $1.475; ½ to ⅝ in., $1.105; 1 to 2 in., 92.5¢; 0.165 to 0.219 in. wall: OD, ⅝ to ⅞ in., 75.5¢; 1 to 2 in., 71.5¢; 3 to 4 in., 70.5¢. Other alloys higher. Base OD: Up to 1½ in., 10,000 lb; 1½ to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	56.79	....	58.86
Copper, h-r ...	58.76	55.11	....
Copper, drawn.	....	56.36	....
Low brass ...	53.15	53.09	....
Yellow brass ..	49.27	49.21	....
Red brass	54.54	54.48	....
Naval brass ..	52.83	47.14	48.40
Leaded brass ..	....	....	48.74
Com. bronze ..	56.48	56.42	....
Mang. bronze..	56.57	50.67	52.33
Phos. bronze ..	77.14	77.64	....
Muntz metal ..	50.94	46.75	48.00
Ni silver, 10 pct	62.05	66.13	68.50

Beryllium copper, CR, 1.9% Be, Base 2000 lb, f.o.b.

Strip	$1.34
Rod, bar, wire	1.31

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	102	83	99
Strip, CR	102	92	125
Rod, Bar, HR..	87	74	93
Angles, HR ...	87	74	93
Plate, HR	97	87	95
Seamless Tube.	122	110	153
Shot, Blocks		71	...

Titanium

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $14.00-$14.50; alloy $16.50; Plate, HR, commercially pure, $11.50-$12.00; alloy, $12.50-$12.75; Wire, rolled and/or drawn, commercially pure, $10.50-$11.00; alloy, $12.50; Bar, HR or forged, commercially pure, $8.50-$8.75; alloy, $8.50-$9.00.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	24.40
Aluminum pig	22.50
Antimony, American, Laredo, Tex..	33.50
Beryllium copper, per lb conta'd Be.	$43.00
Beryllium aluminum 5% Be, Dollars per lb contained Be	$72.75
Bismuth, ton lots	$2.25
Cadmium, del'd	$1.70
Cobalt, 97-99% (per lb).....	$2.60 to $2.67
Copper, electro, Conn. Valley	43.00
Copper, Lake, delivered	43.00
Gold, U. S. Treas., per troy oz. ...	$35.00
Indium, 99.9%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz...$100 to	$120
Lead, St. Louis	15.30
Lead, New York	15.50
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb, pig	32.50
ingot	33.25
Magnesium, sticks, 100 to 500 lb...	53.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$278 to $283
Nickel electro	64.50
Nickel oxide sinter at Copper Cliff, Ont., contained nickel	60.75
Palladium, dollars per troy oz...$22 to	$24
Platinum, dollars per troy oz...$92 to	$95
Silver, New York, cents per troy oz.	91.625
Tin, New York	96.50
Titanium, sponge, grade A-1	$3.95
Zinc, East St. Louis	13.00
Zinc, New York	13.50
Zirconium, sponge .....$7.50 to	$10.00

* Tentative

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	41.00
No. 120	40.50
No. 123	40.00
80-10-10 ingot	
No. 305	44.75
No. 315	43.00
88-10-2 ingot	
No. 210	56.25
No. 215	52.75
No. 245	47.25
Yellow ingot	
No. 405	32.75
Manganese bronze	
No. 421	36.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper max.	32.25-32.25
0.60 copper max.	32.00-32.00
Piston alloys (No. 122 type)..	32.50-32.50
No. 12 alum. (No. 2 grade)...	30.50-31.50
108 alloy	30.50-31.50
195 alloy	32.50-32.50
13 alloy (0.60 copper max.)...	32.00-32.00
AXS-679	30.50-31.50

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½%	31.25-32.25
Grade 2—92-95%	30.25-31.25
Grade 3—90-92%	29.50-30.50
Grade 4—85-90%	29.00-30.00

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	39	38½
Yellow brass	28⅝	26⅝
Red brass	34½	33½
Comm. bronze	35¾	35
Mang. bronze	27	25¾
Yellow brass rod ends	28⅝	

Custom Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	39
No. 2 copper wire	37½
Light copper	35¼
*Refinery brass	35⅛

* Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	39
No. 2 copper wire	37½
Light copper	35¼
No. 1 composition	32
No. 1 comp. turnings	31½
Rolled brass	24¾—25
Brass pipe	24 —24½
Radiators	24½—25
Aluminum	
Mixed old cast.	20 —20½
Mixed new clips	22 —23
Mixed turnings, dry	20½—21½

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	35½—36
No. 2 heavy copper and wire	34 —34½
Light copper	31½—32
New type shell cuttings	31½—32
Auto radiators (unsweated)..	23 —23½
No. 1 composition	28 —29
No. 1 composition turnings ..	27 —28
Unlined red car boxes	23 —23½
Cocks and faucets	23 —23½
Mixed heavy yellow brass	19½—20
Old rolled brass	21 —21½
Brass pipe	23 —23½
New soft brass clippings	25 —25½
No. 1 brass rod turnings	23 —23½

Aluminum

Alum. pistons and struts	16½—17
Aluminum crankcases	16½—17
1100 (2S) aluminum clippings	19½
Old sheet and utensils	16½—17
Borings and turnings	11
Misc. cast aluminum	16½—17
2024 (24s) clippings	18 —18½

Zinc

New zinc clippings	8 — 8⅛
Old zinc	5½— 6
Zinc routings	3¾— 4
Old die cast scrap	3¼— 3½

Nickel and Monel

Pure nickel clippings	90 —100
Clean nickel turnings	75 —80
Nickel anodes	90 —100
Nickel rod ends	90 —100
New Monel clippings	55 —60
Clean Monel turnings	44
Old sheet Monel	45
Nickel silver clippings, mixed	18½—19
Nickel silver turnings, mixed.	19

Lead

Soft scrap lead	12 —12½
Battery plates (dry)	6⅛— 6¾
Batteries, acid free	4¼

Magnesium

Segregated solids	18½—19
Castings	17½—18

Miscellaneous

Block tin	80
No. 1 pewter	60 —63
Auto babbitt	45
Mixed common babbitt	14½
Solder joints	18 —18½
Siphon tops	43
Small foundry type	15 —15⅛
Monotype	15
Lino. and stereotype	14 —14½
Electrotype	12½—12¾
Hand picked type shells	11½
Lino. and stereo. dross	5 — 5½
Electro dross	3⅝— 4¼

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(Effective Oct. 25, 1955)

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		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$96.00 *B3*		4.65 *B3*	6.80 *B3*	4.65 *B3*						
	Buffalo, N. Y.	$68.50 *B3*	$84.50 *R3, B3*	$96.00 *R3, B3*	5.45 *B3*	4.65 *B3*	6.80 *B3*	4.65 *B3*	4.325 *R3,B3*	6.25 *B3* 6.25 *R7,S10*	6.425 *B3*	9.10 *B3*		
	Claymont, Del.													13.45 *C11*
	Harrison, N. J.													
	Conshohocken, Pa.								4.375 *A2*	6.30 *A2*	6.425 *A2*			
	New Bedford, Mass.									6.70 *R6*				
	Johnstown, Pa.	$68.50 *B3*	$84.50 *B3*	$96.00 *B3*		4.65 *B3*	6.80 *B3*							
	Boston, Mass.									6.80 *T8*				13.80 *T8*
	New Haven, Conn.									6.70 *D1* 7.00 *A5*				
	Phoenixville, Pa.					5.15 *P2*		5.15 *P2*						
	Sparrows Pt., Md.								4.325 *B3*	6.25 *B3*	6.425 *B3*	9.10 *B3*		
	Bridgeport, Wallingford, Conn.	$73.50 *N8*	$89.50 *N8*						4.625 *N8*	6.70 *W1*			7.50 *N8*	
	Pawtucket, R. I. Worcester, Mass.									6.80 *N7* 7.10 *A5*				*A5* 13.80 *N7*
MIDDLE WEST	Alton, Ill.								4.50 *L1*					
	Ashland, Ky.								4.325 *A7*					
	Canton-Massillon, Dover, Ohio		$86.50 *R3*	$96.00 *R3*										13.45 *G4*
	Chicago, Ill.	$68.50 *U1*	$84.50 *R3, U1,W8*	$96.00 *R3, U1,W8*	5.45 *U1*	4.60 *U1, W8*	6.75 *U1, Y1*	4.60 *U1*	4.325 *A1, N4,W8*	6.35 *A1,T8*			7.20 *W8*	13.45 *T8*
	Cleveland, Ohio									6.25 *A5,J3*		9.30 *A5*		13.45 *A5*
	Detroit, Mich.			$96.00 *R5*					4.425 *G3,M2*	6.35 *D1,D2, G3,M2,P11*	6.525 *G3*	9.20 *D2, G3*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$68.50 *U1*	$84.50 *U1*	$96.00 *U1, Y1*	5.45 *I3*	4.60 *U1, I3*	6.75 *U1, I3*		4.325 *I3, U1,Y1*	6.35 *I3* 6.25 *Y1*	6.425 *I3, U1,Y1*	9.30 *Y1*	7.20 *Y1, U1*	
	Sterling, Ill.								4.425 *N4*					
	Indianapolis, Ind.									6.40 *C5*				
	Newport, Ky.												7.20 *N5*	
	Middletown, Ohio									6.45 *A7*				
	Niles, Warren, Ohio Sharon, Pa.	$68.50 *C10*	$84.50 *C10*	$96.00 *C10*					4.325 *S1, R3*	6.25 *S1, R3,T4*	6.425 *S1, R3*	9.10 *S1, R3*	7.20 *S1*	13.45 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$68.50 *U1, J3*	$84.50 *J3, U1,C11*	$96.00 *U1, C11*	5.45 *U1*	4.60 *U1, J3*	6.75 *U1, J3*	4.60 *U1*	4.325 *P6*	6.25 *S7,B4*			7.20 *S9*	13.45 *S9*
	Portsmouth, Ohio								4.325 *P7*	6.25 *P7*				
	Weirton, Wheeling, Follansbee, W. Va.					4.60 *W3*			4.325 *W3*	6.25 *F3,W3*	6.425 *W3*	9.10 *W3*		
	Youngstown, Ohio		$84.50 *C10*	$96.00 *Y1, C10*		4.60 *Y1*	6.75 *Y1*		4.325 *U1, Y1*	6.25 *Y1,C5*	6.425 *U1, Y1*	9.30 *Y1*	7.20 *U1, Y1*	13.45 *C5*
WEST	Fontana, Cal.	$76.00 *K1*	$92.00 *K1*	$115.00 *K1*		5.25 *K1*	7.40 *K1*	5.40 *K1*	5.075 *K1*	8.00 *K1*	7.525 *K1*		8.85 *K1*	
	Geneva, Utah		$84.50 *C7*			4.60 *C7*	6.75 *C7*							
	Kansas City, Mo.					4.70 *S2*	6.85 *S2*				6.675 *S2*		7.45 *S2*	
	Los Angeles, Torrance, Cal.		$94.00 *B2*	$116.00 *B2*		5.30 *C7, B3*	7.45 *B2*		5.075 *C7, B3*	8.30 *C1*			8.40 *B2*	
	Minnequa, Colo.					4.90 *C6*			5.425 *C6*					
	Portland, Ore.					5.35 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$94.00 *B2*			5.25 *B2, P9*	7.40 *B2*		5.075 *B2, C7*					
	Seattle, Wash.		$96.00 *B2*			5.35 *B2*	7.50 *B2*		5.325 *B2*					
SOUTH	Atlanta, Ga.								4.525 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$68.50 *T2*	$84.50 *T2*			4.60 *C16, R3,T2*	6.75 *T2*		4.325 *R3, C16,T2*		6.425 *T2*			
	Houston, Lone Star, Tex.	$74.50 *L3*	$89.50 *S2*	$101.00 *S2*		4.70 *S2*	6.85 *S2*				6.675 *S2*		7.45 *S2*	

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		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized *10* ga.	Enameling *12* ga.	Long Terne *10* ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled *19* ga.		Cokes° *1.25*-lb. base box	Electro° *0.25*-lb. base box	Holloware Enameling *29* ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.325 *B3*	5.325 *B3*				6.375 *B3*	7.875 *B3*			*W6*	† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box. ° COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.375 *A2*	5.375 *A2*				6.425 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										5.025 *B3*			
	Fairless, Pa.	4.375 *U1*	5.375 *U1*				6.425 *U1*	7.925 *U1*				$9.30 *U1*	$8.00 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.325 *B3*	5.325 *B3*	5.85 *B3*			6.375 *B3*	7.875 *B3*	8.60 *B3*		5.125 *B3*	$9.30 *B3*	$8.00 *B3*	
	Worcester, Mass.										5.325 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										5.20 *L1*			
	Ashland, Ky.	4.325 *A7*		5.85 *A7*	5.90 *A7*									
	Canton-Massillon, Dover, Ohio			5.85 *R1, R3*										
	Chicago, Joliet, Ill.	4.325 *A1, W8*					6.375 *U1*				5.025 *A5, N4, R3*			
	Sterling, Ill.										5.125 *N4*			
	Cleveland, Ohio	4.325 *J3, R3*	5.325 *J3, R3*		5.90 *R3*		6.375 *J3, R3*	7.875 *J3, R3*			5.025 *A5*			
	Detroit, Mich.	4.425 *G3, M2*	5.425 *G3* 5.325 *M2*				6.475 *G3*	7.975 *G3*						
	Newport, Ky.	4.325 *N5*	5.325 *N5*	5.85 *N5*										
	Gary, Ind. Harbor, Indiana	4.325 *I3, U1, Y1*	5.325 *I3, U1, Y1*	5.85 *U1, I3*	5.90 *U1, I3*	6.25 *U1*	6.375 *Y1, U1, I3*	7.875 *U1, Y1*			5.025 *Y1*	$9.20 *I3, U1, Y1*	$7.90 *I3, U1, Y1*	6.65 *U1, Y1*
	Granite City, Ill.	4.525 *G2*	5.525 *G2*	6.05 *G2*	6.10 *G2*								$8.00 *G2*	6.75 *G2*
	Kokomo, Ind.	4.425 *C9*		5.95 *C9*						5.475 *C9*	5.125 *C9*			
	Mansfield, Ohio	4.325 *E2*	5.325 *E2*			6.25 *E2*				*E2*				
	Middletown, Ohio		5.325 *A7*	5.85 *A7*	5.90 *A7*	6.25 *A7*								
	Niles, Warren, Ohio Sharon, Pa.	4.325 *S1, R3, N3*	5.325 *R3, N3*	5.85 *R3* 6.85 *N3*	5.90 *N3*	6.25 *N3*	6.375 *S1, R3*	7.875 *R3*				$9.20 *R3*	$7.90 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.325 *J3, U1, P6*	5.325 *J3, U1, P6*	5.85 *U1*	5.90 *U1, A7*		6.375 *J3, U1*	7.875 *U1*	8.60 *U1*		5.025 *A5, P6*	$9.20 *J3, U1*	$7.90 *J3, U1*	6.65 *U1*
	Portsmouth, Ohio	4.325 *P7*	5.325 *P7*								5.025 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.325 *W3, W5*	5.325 *W3, W5, F3*	5.85 *W3, W5*		6.25 *W3, W5*	6.375 *W3*	7.875 *W3*				$9.20 *W3, W5*	$7.90 *W3, W5*	6.65 *F3, W5*
	Youngstown, Ohio	4.325 *U1, Y1*	5.325 *Y1*		5.90 *Y1*		6.375 *U1, Y1*	7.875 *Y1*			5.025 *Y1*			
WEST	Fontana, Cal.	5.075 *K1*	6.425 *K1*				7.125 *K1*	8.975 *K1*						
	Geneva, Utah	4.425 *C7*												
	Kansas City, Mo.										5.275 *S2*			
	Los Angeles, Torrance, Cal.										5.325 *B2*			
	Minnequa, Colo.										5.275 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.025 *C7*	6.275 *C7*	6.60 *C7*							5.675 *C7*	$9.95 *C7*	$8.65 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.325 *R3, T2*	5.325 *T2*	5.85 *R3, T2*			6.375 *T2*			5.625 *R3*	5.025 *R3, T2*	$9.30 *T2*	$8.00 *T2*	
	Houston, Tex.										5.275 *S2*			

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		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				5.575 *B3*	7.425 *B3*	6.80 *B3*					
	Buffalo, N. Y.	4.65 *B3,R3*	4.65 *B3,R3*	5.95 *B5*	5.575 *B3,R3*	7.425 *B3,B5*	6.80 *B3*	4.50 *B3,R3*				6.25 *W6*
	Claymont, Del.							4.80 *C4*		6.30 *C4*	6.725 *C4*	
	Coatesville, Pa.							4.80 *L4*		6.30 *L4*	6.725 *L4*	
	Conshohocken, Pa.							4.50 *A2*	5.575 *A2*		6.725 *A2*	
	Harrisburg, Pa.							5.10 *C3*	5.575 *C3*			
	Hartford, Conn.			6.40 *R3*		7.725 *R3*						
	Johnstown, Pa.	4.65 *B3*	4.65 *B3*		5.575 *B3*		6.80 *B3*	4.50 *B3*		6.30 *B3*	6.725 *B3*	6.25 *B3*
	Fairless, Pa.	4.80 *U1*	4.80 *U1*		5.725 *U1*							
	Newark, N. J.			6.35 *W10*		7.60 *W10*						
	Camden, N. J.			6.35 *P10*								
	Bridgeport, Putnam, Conn.	4.80 *N8*		6.45 *W10*	5.725 *N8*			4.750 *N8*				
	Sparrows Pt., Md.		4.65 *B3*					4.50 *B3*		6.30 *B3*	6.725 *B3*	6.35 *B3*
	Palmer, Worcester, Readville, Mass.			6.35 *W11* 6.45 *B5,C14*		7.725 *A5,B5*		4.50 *R3*				6.55 *A5, W6*
	Spring City, Pa.			6.35 *K4*		7.60 *K4*						
MIDDLE WEST	Alton, Ill.	4.85 *L1*										6.425 *L1*
	Ashland, Newport, Ky.							4.50 *A7,N5*		6.30 *N5*		
	Canton-Massillon, Mansfield, Ohio	4.75 *R3*		5.90 *R2,R3*	5.575 *R3,T5*	7.425 *R2,R3, T5*		4.50 *E2*				
	Chicago, Joliet, Ill.	4.65 *U1, N4,W8,R3, P13*	4.65 *N4,R3, P13*	5.90 *A5,W10, W8,B5,L2*	5.575 *U1,R3, W8*	7.425 *A5,W8, W10,L2,B5*		4.50 *U1,W8, I3,A1,R3*	5.575 *U1*	6.30 *U1*	6.725 *U1*	6.25 *A5,R3, N4,W7*
	Cleveland, Ohio	4.65 *R3*	4.65 *R3*	5.90 *A5,C13*		7.425 *A5,C13*	6.80 *R3*	4.60 *J3,R3*	5.575 *J3*		6.725 *R3,J3*	6.25 *A5, C13*
	Detroit, Mich.	4.75 *G3*	4.75 *G3*	5.90 *R5* 6.10 *B5,P8* 6.15 *P3*	5.575 *R5* 5.675 *G3*	7.425 *R5* 7.625 *B5,P3 P8*	6.90 *G3*	4.60 *G3*			6.825 *G3*	
	Duluth, Minn.											6.25 *A5*
	Gary, Ind. Harbor, Crawfordsville	4.65 *I3, U1, Y1*	4.65 *I3, U1, Y1*	5.90 *M5,R3*	5.575 *I3, U1, Y1*	7.425 *M5, R3*	6.80 *U1,I3, Y1*	4.50 *I3, U1,Y1*	5.575 *I3*	6.30 *U1,Y1*	6.725 *U1, I3,Y1*	6.35 *M4*
	Granite City, Ill.							4.70 *G2*				
	Kokomo, Ind.											6.35 *C9*
	Sterling, Ill.	4.75 *N4*	4.75 *N4*									6.35 *N4*
	Niles, Warren, Ohio Sharon, Pa.	4.65 *R3,C10*		5.90 *C10*	5.575 *C10*	7.425 *C10*	6.80 *R3*	4.50 *S1,R3*		6.30 *S1*	6.725 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.65 *J3, U1, C11*	4.65 *J3, U1*	5.90 *A5,C8, C11,J3, W10,B4,R3*	5.575 *U1,C11*	7.425 *A5,C11, W10,C8,R3*	6.80 *J3, U1*	4.50 *J3, U1*	5.575 *U1*	6.30 *U1*	6.725 *J3, U1*	6.25 *A5,J3, P6*
	Portsmouth, Ohio											6.25 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.65 *W3*						4.50 *W3,W5*				
	Youngstown, Ohio	4.65 *U1,Y1, C10,R3*	4.65 *U1,Y1, R3*	5.90 *Y1, U1*	5.575 *U1,Y1, C10*	7.425 *Y1,C10* 7.625 *F2*	6.80 *U1,Y1*	4.50 *U1,Y1, R3*		6.30 *Y1*	6.725 *Y1*	6.25 *Y1*
WEST	Emeryville, Cal.	5.40 *J5*	5.40 *J5*									
	Fontana, Cal.	5.35 *K1*	5.35 *K1*		6.625 *K1*		7.50 *K1*	5.15 *K1*		6.95 *K1*	7.375 *K1*	
	Geneva, Utah							4.50 *C7*			6.725 *C7*	
	Kansas City, Mo.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*					6.50 *S2*
	Los Angeles, Torrance, Cal.	5.35 *B2,C7*	5.35 *B2,C7*	7.35 *R3*	6.625 *B2*		7.50 *B2*				7.625 *B2*	7.20 *B2*
	Minnequa, Colo.	5.10 *C6*	5.10 *C6*					5.35 *C6*				6.50 *C6*
	Portland, Ore.	5.40 *O2*	5.40 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.35 *C7* 5.40 *B2,P9*	5.35 *C7* 5.40 *B2,P9*				7.55 *B2*					7.20 *C7*
	Seattle, Wash.	5.40 *B2,P12, N6*	5.40 *B2,P12*				7.55 *B2*	5.40 *B2*		7.20 *B2*	7.625 *B2*	
SOUTH	Atlanta, Ga.	4.85 *A8*	4.85 *A8*									6.45 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	4.65 *T2,C16, R3*	4.65 *T2,C16, R3*				6.90 *T2*	4.50 *T2,R3*			6.725 *T2*	6.25 *R3, T2*
	Houston, Ft. Worth, Lone Star, Tex.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*	4.85 *L3* 4.90 *S2*		6.40 *S2*	6.825 *S2*	6.50 *S2*

Steel Prices *(Effective Oct. 25, 1955)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Blinn & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del
C5 Cold Metal Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
D5 Henry Disston & Sons, Inc., Philadelphia

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmith Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P12 Pacific Steel Rolling Mills, Seattle
P13 Phoenix Mfg. Co., Joliet, Ill.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.

Y1 Youngstown Sheet & Tube Co., Youngstown

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $280 per net ton.

	BUTTWELD														SEAMLESS							
	⅛ In.		¼ In.		⅜ In.		½ In.		¾ In.		1 In.		1¼ In.		2 In.		2½ In.		3 In.		3½–4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3* [4]	15.50	9.25	18.50	4.25	21.00	7.75	23.50	8.50	24.00	9.50	24.50	10.00	26.00	9.75	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	17.50	9.25	20.50	4.25	23.00	7.75	25.50	9.00	26.00	10.00	26.50	10.50	28.00	10.75	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	6.00	+9.25	9.00	+5.25	11.50	+1.75	14.00	+1.00	14.50	+0.00	15.00	0.50	16.50	0.25	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Alton, Ill. *L1*	15.50	0.25	18.50	4.25	21.00	7.75	23.50	8.50	24.00	9.50	24.50	10.00	26.00	9.75	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	15.00	0.25	18.50	4.25	21.00	7.75	23.50	8.50	24.00	9.50	24.50	10.00	26.00	9.75	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Wheeling *W5*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Youngstown *Y1*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	.....	.....	.....	.....	.....	.....	.....	.....
Indiana Harbor *Y1*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	20.0	6.25	24.00	10.25	26.00	13.75	26.50	12.50	27.00	13.50	27.50	14.00	28.00	12.75	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	22.0	6.25	26.00	10.25	28.00	13.75	28.50	13.00	29.00	14.00	29.50	14.50	30.00	13.75	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	20.0	6.25	24.00	10.25	26.00	13.75	26.50	12.50	27.00	13.50	27.50	14.00	28.00	12.75	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	10.50	.....	14.50	.....	16.50	.....	17.00	.....	17.50	.....	18.00	.....	19.50	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	22.0	9.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Alton, Ill. *L1*	22.0	9.25	26.00	12.25	28.00	13.75	26.50	12.50	27.00	13.50	27.50	14.00	28.00	12.75	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	22.0	9.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	22.0	9.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Wheeling *W5*	22.0	9.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	22.0	9.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	22.0	9.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Indiana Harbor *Y1*	21.0	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	22.0	9.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75

Threads only, buttweld and seamless 2½ pt higher discount. Plain ends, buttweld and seamless, 3-in. and under, 4½ pt higher discount. Buttweld jobbers discount, 5 pct.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb, East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2 in., 1½ pt.; 2½ and 3-in., 1 pt. e.g., zinc price range of over 11¢ to 13¢ would lower discounts; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.80¢ per lb.

Steel Prices *(Effective Oct. 25, 1955)*

To identify producers, see Key on preceding page.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *U1*	4.725	5.65	5.825	.....	.....	.....	.....
So. Chicago *R3*	.....	.....	.....	7.50	.....	.....	.....
Ensley *T2*	4.725	5.65	.....	.....	.....	.....	.....
Fairfield *T2*	.....	5.65	.....	7.50	.....	5.625	.....
Gary *U1*	4.725	5.65	.....	.....	.....	5.625	.....
Ind. Harbor *I3*	4.725	.....	5.825	7.50	.....	5.525	.....
Johnstown *B3*	.....	5.65	.....	.....	.....	.....	.....
Joliet *U1*	.....	5.65	5.825	.....	.....	.....	.....
Kansas City *S2*	.....	.....	.....	7.90	.....	.....	.....
Lackawanna *B3*	4.725	5.65	5.825	.....	.....	5.625	.....
Minnequa *C6*	4.725	6.15	5.825	7.50	.....	5.625	12.40
Pittsburgh *O1*	.....	.....	.....	.....	11.90	.....	12.40
Pittsburgh *P5*	.....	.....	.....	.....	.....	.....	12.40
Pittsburgh *J3*	.....	.....	.....	7.90	.....	.....	.....
Seattle *B2*	.....	.....	.....	8.40	.....	5.775	12.90
Steelton *B3*	4.725	.....	5.825	.....	.....	5.625	.....
Struthers *Y1*	.....	.....	.....	7.90	.....	.....	.....
Torrance *C7*	.....	.....	.....	.....	.....	5.775	.....
Williamsport *S5*	.....	5.65	.....	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	7.90	.....	.....	.....

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	8.40	8.80	.....
Armature	9.35	9.60	10.10
Elect.	9.95	10.20	10.70
Motor	10.95	11.20	11.70
Dynamo	11.85	12.10	12.60
Trans. 72	12.80	13.05	13.55
		Grain Oriented	
Trans. 65	13.35	Trans. 80	17.45
Trans. 58	13.85	Trans. 73	17.95
Trans. 52	14.85		

Producing points: Beech Bottom (*W5*); Brackenridge (*A5*); Granite City (*G2*); Indiana Harbor (*I5*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville (*A7*).
* Coils 75¢ higher.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Col	Woven Wire Fence 9-15½ ga. Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	152	162	.....	173	175	7.40	7.80
Aliquippa, Pa. *J3*	152	162	.....	.....	.....	7.40	7.80
Atlanta *A8*	154	167	.....	175	180	7.50	8.025
Bartonville *K2**	154	168	.....	175	181	7.50	8.075
Buffalo *W6*	.....	.....	.....	.....	.....	7.40	7.80
Chicago, Ill. *N4***	152	166	.....	173	179	7.40	8.00
Cleveland *A6*	157	.....	.....	.....	.....	7.40	.....
Cleveland *A5*	.....	.....	.....	.....	.....	7.40	.....
Crawfordsville *M4**	154	167	.....	175	175	7.50	8.05
Donora, Pa. *A5*	152	162	.....	173	175	7.40	7.80
Duluth *A5*	152	162	.....	173	175	7.40	7.80
Fairfield, Ala. *T2*	152	162	.....	173	175	7.40	7.80
Galveston *D4*	157	.....	.....	.....	.....	.....	.....
Houston *S2*	167	170	.....	.....	180	7.65	8.06
Johnstown, Pa. *B3**	152	166	.....	.....	175	7.40	7.80
Joliet, Ill. *A5*	152	162	.....	173	175	7.40	7.80
Kokomo, Ind. *C9*	154	154	.....	175	177	7.50	7.90
Los Angeles *B2**	.....	.....	.....	.....	.....	8.35	8.925
Kansas City *S2*	167	174	.....	178	180	7.65	8.05
Minnequa *C6*	157	167	162	178	180	7.65	8.05
Monessen *P6*	152	162	.....	.....	.....	7.40	7.80
Moline, Ill. *R3*	.....	163	162	.....	.....	.....	.....
Pittsburg, Cal. *C7*	171	183	.....	.....	195	8.35	8.75
Portsmouth *P7*	.....	.....	.....	.....	.....	7.40	.....
Rankin, Pa. *A5*	152	162	.....	.....	175	7.40	7.80
So. Chicago *R3*	152	162	157	173	175	7.40	7.80
S. San Francisco *C6*	.....	.....	.....	197	195	8.35	8.75
Sparrows Pt. *B3**	154	.....	.....	175	181	7.50	8.075
Struthers, O. *Y1*	.....	.....	.....	.....	.....	7.40	7.90
Worcester *A5*	158	.....	.....	.....	.....	7.70	.....
Williamsport, Pa. *S5*	.....	.....	160	.....	.....	.....	.....

Galvanized products computed with zinc at 5¢ per lb. Exceptions: *zinc at 12.5¢ per lb; **13¢ zinc.

WAREHOUSES

Base price, f.o.b., dollars per 100 lb.

City	City Delivery Charge	Sheets: Hot-Rolled	Sheets: Cold-Rolled	Sheets: Galvanized (18 gage)	Strip: Hot-Rolled	Strip: Cold-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Baltimore	$.10	7.03	8.32	8.37	7.65	.....	7.21	7.93	7.61	8.62	14.38	13.44–13.96	16.36	16.29–16.49
Birmingham	.15	6.89	7.93	8.85	7.06	.....	6.99	7.28	7.08	9.35	.....	.....	.....	.....
Boston	.10	7.70	8.81	10.27	7.94–7.96	10.39	7.89	8.13	7.83	9.53	13.65–13.80	13.40–13.45	16.65	16.50
Buffalo	.30	6.80	8.05	9.77	7.15	.....	7.15	7.40	7.10	7.90	.....	13.10	.....	16.15
Chicago	.25	6.80	8.09	8.50	7.06	.....	6.99	7.28	7.08	7.75	13.20	12.85	16.05	15.90
Cincinnati	.25	6.92	8.33	8.90	7.30	.....	7.28	7.75	7.32	8.05	13.44	13.09	16.29	16.14
Cleveland	.30	6.80	8.09	8.85	7.16	.....	7.16	7.61	7.14	7.85	.....	12.91	.....	15.96
Denver		8.60	10.80	11.22	8.90	.....	8.60	8.75	8.90	9.82	.....	.....	.....	17.97
Detroit	.25	6.99	8.53	8.78	7.34	8.15	7.27	7.75	7.36	8.04	13.40	13.05	16.25	16.10
Houston		7.85	8.75	10.49	8.15	.....	7.80	8.20	8.25	9.85–9.95	14.35	14.00	17.15	16.80
Kansas City	.20	7.47	8.60	9.17	7.73	.....	7.66	7.95	7.75	8.52	.....	13.52	.....	.....
Los Angeles	.10	8.05	10.00	11.00	8.35	.....	8.05	8.30	8.05	11.25	.....	14.25	.....	17.85
Memphis	.10	7.12	8.25	.....	7.38	.....	7.31	7.60	7.40	9.15	.....	.....	.....	.....
Milwaukee	.25	6.89	8.18	8.59	7.15	.....	7.08	7.45	7.17	7.94	.....	12.94	.....	15.99
New Orleans	.15	7.20	8.35	.....	7.45	.....	7.40	7.70	7.50	9.50	.....	.....	.....	.....
New York	.10	7.46	8.68	9.44	8.07	9.95	7.76	7.99	7.96	9.48	13.63	13.28	16.48	16.33
Norfolk	.20	7.25	.....	.....	7.65	.....	7.45	7.95	7.65	9.50	.....	.....	.....	.....
Philadelphia	.10	7.14	8.42	9.35	7.67	.....	7.37	7.74	7.64	8.46	13.51	13.16	16.36	16.21
Pittsburgh	.25	6.80	8.09	9.20	7.16	9.00	6.99	7.28	7.08	7.85	13.20	12.85	16.05	15.90
Portland		7.80–8.60	8.80	10.65	8.00	.....	7.75	7.85–8.15	7.95	12.20	.....	15.00	.....	17.50
Salt Lake City	.20	.....	10.60	.....	9.35	.....	.....	9.20	9.15	.....	.....	.....	.....	.....
San Francisco	.10	8.10	9.65	10.15	8.35	.....	8.05	8.25	8.05	11.20*	.....	14.25	.....	17.85
Seattle	.00	8.55	10.40	10.80	8.65	.....	8.20	8.30	8.35	11.70	.....	14.60	.....	17.65
St. Louis	.25	7.00	8.38	9.19	7.35	.....	7.28	7.68	7.37	8.14	13.49	13.14	16.35	16.19
St. Paul	.25	7.46	8.59–9.14	9.16	7.72	.....	7.65	7.94	7.74	8.51	.....	13.51	.....	16.38

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.
Exceptions: (1) 1500 to 9999 lb. (2) 1000 lb or over. (3) $.25 delivery. (4) 1000 to 1999 lb, $.25 delivery.
* Plus analysis charge.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Buffalo, N. Y. *R7*	7.00	8.95	10.50	12.65	15.35
Carnegie, Pa. *S9*	.....	8.95	10.50	12.65	15.35
Cleveland *A5*	7.00	8.95	10.50	12.65	15.35
Detroit *D1*	7.10	9.05	10.60	12.75	.....
Detroit *D2*	7.10	9.05	10.60	.....	.....
Harrison, N. J. *C11*	.....	.....	10.80	12.95	15.65
Indianapolis *C6*	7.15	9.10	10.50	12.65	15.35
New Castle, Pa. *B4*	7.00	8.95	10.50	12.65	.....
New Haven, Conn. *D1*	7.45	9.25	10.80	12.95	.....
Pawtucket, R. I. *N7*	7.55	9.25	10.80	12.95	15.65
Pittsburgh *S7*	7.00	8.95	10.50	12.65	15.35
Riverdale, Ill. *A1*	7.10	8.95	10.50	12.65	15.35
Sharon, Pa. *S1*	7.00	8.95	10.50	12.65	15.35
Trenton *R4*	.....	.....	.....	.....	.....
Wallingford *W1*	7.45	9.25	10.80	12.95	15.65
Warren, Ohio *T4*	7.00	8.95	10.50	12.65	15.35
Weirton, W. Va. *W3*	7.10	8.95	10.50	.....	.....
Worcester, Mass. *A5*	7.85	9.25	10.80	12.95	15.65
Youngstown *C5*	7.00	8.95	10.50	12.65	15.35

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	30.87	36.51	29.94	.....
	2½	12	41.57	49.16	40.31	.....
	3	12	47.99	56.76	46.54	.....
	3½	11	56.03	66.27	54.34	.....
	4	10	74.41	88.00	72.16	.....
National Tube	2	13	30.87	36.51	29.94	.....
	2½	12	42.57	49.16	40.31	.....
	3	12	47.99	56.76	46.54	.....
	3½	11	56.03	66.27	54.34	.....
	4	10	74.41	88.00	72.16	.....
Pittsburgh Steel	2	13	30.87	36.51	.....	.....
	2½	12	41.57	49.16	.....	.....
	3	12	47.99	56.76	.....	.....
	3½	11	56.03	66.27	.....	.....
	4	10	74.41	88.00	.....	.....

Miscellaneous Prices

(Effective Oct. 25, 1955)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb
18	4	1	—	—	$1.60
18	4	1	—	5	2.305
18	4	2	—	—	1.765
1.5	4	1.5	8	—	.96
6	4	3	6	—	1.35
6	4	2	5	—	1.105

High-carbon chromium	.77
Oil hardened manganese	.42
Special carbon	.39
Extra carbon	.32
Regular carbon	.275

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb. f.o.b.

	Cladding	Plate (A3, J2, L4) 10 pct	Plate (A3, J2, L4) 15 pct	Plate (A3, J2, L4) 20 pct	Sheet (I2) 20 pct
Stainless Type	304	30.30	33.15	36.05	32.50
	316	35.50	38.45	41.40	47.00
	321	32.00	34.85	37.75	37.25
	347	34.40	37.90	41.40	48.25
	405	25.80	29.60	33.35	.....
	410, 430	25.30	29.10	32.85	.....

CR Strip (S9) Copper, 10 pct, 2 sides, $8.00; 1 side, $6.00.

LAKE SUPERIOR ORES

$1.50% Fe; natural content, delivered lower Lake ports. Prices effective for 1955 season.

	Gross Ton
Openhearth lump	$11.25
Old range, bessemer	10.40
Old range, nonbessemer	10.25
Mesabi, bessemer	10.25
Mesabi, nonbessemer	10.10
High phosphorus	10.00

COKE

	Net-Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$13.00 to $13.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.00 to $16.50
Foundry, oven coke	
Buffalo, del'd	$28.08
Chicago, f.o.b.	25.75
Detroit, f.o.b.	26.25
New England, del'd	26.05
Seaboard, N. J., f.o.b.	25.50
Philadelphia, f.o.b.	25.00
Swedeland, Pa., f.o.b.	25.00
Plainesville, Ohio, f.o.b.	25.50
Erie, Pa., f.o.b.	25.00
Cleveland, del'd	27.42
Cincinnati, del'd	26.56
St. Paul, f.o.b.	23.75
St. Louis, f.o.b.	26.00
Birmingham, f.o.b.	24.40
Lone Star, Tex., f.o.b.	19.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	GRAPHITE Length (In.)	GRAPHITE Price	CARBON* Diam. (In.)	CARBON* Length (In.)	CARBON* Price
24	84	23.00	40	100, 110	9.90
20	72	22.25	35	110	9.90
16 to 18	72	22.50	30	110	10.05
14	72	23.00	24	72 to 84	10.30
13	72	23.50	20	90	10.10
10	60	24.25	17	72	10.35
7	60	24.50	14	72	10.85
6	60	27.25	12	60	11.75
4	40	30.25	10	60	11.80
3	40	32.00	8	60	12.10
2½	30	33.75			
2	24	32.00			

* Prices shown cover carbon nipples.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolts

	Case over 20,000 lb.	Discount under 20,000 lb.
½ in. & smaller x 6 in. & shorter	61	63
Larger than ½ in. diam. and all diam. longer than 6 in.	55	57
Rolled thread carriage bolts ½ in. & smaller x 6 in. and shorter	61	63
Lag, all diam. x 6 in. & shorter	61	63
Lag, all diam. longer than 6 in.	55	57
Plow bolts	61	63

Nuts, Hex., H.P., reg. & hvy.

¾" or smaller	64	66
⅞" to 1⅛" inclusive	63	65
1¼" to 1½" inclusive	65	67
1⅝" and larger	61	63

C.P. Hex. regular & hvy.

¾" or smaller	64	66
⅞" and larger	61	63

Hot Galv. Nuts (all types)

1½" or smaller	44	47

Finished, Semi-finished, Hex. Nuts

¾" and smaller	66	66
⅞" and larger	63	63

* Broken cases 25% more.

Rivets

	Base per 100 lb
⅛ in. and larger	$9.95
	Pct Off List
7/16 in. and smaller	32

Cap Screws

	Discount Bright	Discount H.C. Heat Treated
New std. hex head, packaged ¼" thru ⅛" diam. x 6" and shorter	34	20
9/16 and ⅝" x 6" and smaller and shorter	31	16
⅝", ¾", 1" x 6" and shorter	8	+11
New std. hex head, bulk* ¼" thru ⅛" diam. x 6" and shorter	49	41
9/16" and ⅝" diam. x 6" and shorter	48	39
⅝", ¾", 1" x 6" and shorter	31	20

*Minimum quantity per item:
15,000 pieces ¼", 5/16", ⅜" diam.
5,000 pieces 7/16", ½", 9/16", ⅝" diam.
2,000 pieces ¾", ⅞", 1" diam.

Machine Screws & Stove Bolts

	Discount Mach. Screws	Discount Stove Bolts
Packaged, package list	27	38
Bulk, bulk list		
Quantity		
¼-in. diam. & under; 5/16-in. diam. & larger	25,000-200,000	20	61
5/16-in. diam. & larger	15,000-100,000	20	61
All diam. over 3 in. long	5,000-100,000	—	61

Machine Screw & Stove Bolt Nuts

	Discount Hex	Discount Square
Packaged, package list	24	27
Bulk, bulk list		
Quantity		
⅝-in. diam. & smaller	25,000-200,000	18	20

CAST IRON WATER PIPE INDEX

Birmingham	109.3
New York	121.5
Chicago	122.9
San Francisco-L. A.	131.1

Sept. 1955 value, Class B or heavier, 6 in. or larger, bell and spigot pipe. Explanation: p. 87, Sept. 1 issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick — *Carloads per 1000*

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$122.00
No. 1 Ohio	.....
Sec. quality, Pa., Md., Ky., Mo., Ill.	114.00
No. 2 Ohio	.....
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	18.00

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$128.00
Childs, Hays, Pa.	133.00
Chicago District	136.00
Western Utah	.....
California	.....
Super Duty Hays, Pa., Athens, Tex., Windham	145.00
Curtner, Calif.	163.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	21.00
Silica cement, net ton, bulk, Hays, Pa.	24.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	22.00
Silica cement, net ton, bulk, Utah and Calif.	.....

Chrome Brick — *Per net ton*

Standard chemically bonded, Balt.	$86.00
Standards chemically bonded, Curtner, Calif.	96.25
Burned, Balt.	80.00

Magnesite Brick

Standard Baltimore	$109.00
Chemically bonded, Baltimore	97.50

Grain Magnesite — *St. ¾-in. grains*

Domestic, f.o.b. Baltimore in bulk fines removed	$64.40
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	40.00
in sacks	46.00

Dead Burned Dolomite — *Per net ton*

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$15.00
Midwest	15.60
Missouri Valley	14.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.l.f. New York, ocean bags	11.25¢
Canadian sponge iron, Del'd in East, carloads	11.50¢
Domestic sponge iron, 98+% Fe, carload lots	9.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	37.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	53.5¢
Hydrogen reduced iron minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.5+% Fe	83.0¢ to $1.48
Aluminum freight allowed	34.50¢
Brass, 10 ton lots	37.50¢ to 50.00¢
Copper, electrolytic	58.75¢
Copper, reduced	58.75¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99% min., and quality, del'd	$3.60
Lead	7.50¢ plus metal value
Manganese	57.0¢
Molybdenum, 99%	$3.00 to $3.25
Nickel, unannealed	86.75¢
Nickel, annealed	$1.06
Nickel, spherical, unannealed	93.50¢
Silicon	43.50¢
Solder powder	7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	91.0¢
Stainless steel, 316	$1.10
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	$4.50
Zinc, 10 ton lots	18.75¢ to 32.50¢

Eriez Permanent Magnets to SEPARATE... RETRIEVE... PURIFY

OLD IRON PANTS AND THE MAGNET. A lady from yesterday with a metal-ribbed girdle wouldn't be safe next to an Eriez Permanent Non-electric Magnet. She might easily be "hung up" by the powerful Alnico V action. This idea of herculean power and permanent dependability now offers the metalworking industry many new ideas for separation, purification, and retrieving of ferrous material from places where it would cause machinery damage or product defects. In addition, Eriez Magnets designed to control and convey metals at high speeds have presented new concepts in plant automation.

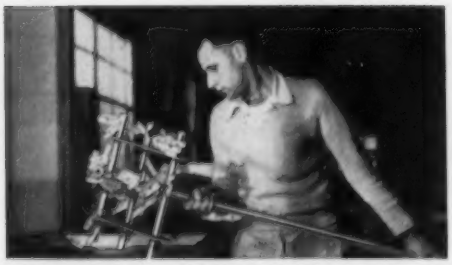
SOLVE HUNDREDS OF METAL-WORKING PRODUCTION PROBLEMS

● Famous for years as magnetic separators to remove tramp iron from processing lines of all kinds, Eriez Permanent Non-electric Magnets have recently found widespread acceptance in the metalworking industry, where they are used to separate, retrieve and purify. In addition, Eriez Magnets especially designed for controlling and conveying purposes, move steel horizontally, vertically, or up steep inclines at such speeds as to allow peak production. Easily installed on new or existing equipment, Eriez Magnets have opened up many new ideas in plant automation, and are destined to play a major role in the metalworking industry. *All Eriez Magnets are non-electric, self-contained. They have no wires or attachments. There is no operating cost; first cost is the last. Powerful Alnico V elements are guaranteed to keep their strength indefinitely.*

Write for big new "Magnets for Metalworking" Bulletin

ERIEZ SHEET FANNER MAGNETS. Here's the magnet to speed up sheet metal handling and increase production. Slow, costly hand separation is completely eliminated . . . no more double feeding, no scratched surfaces, no cut fingers. An Eriez Sheet Fanner Magnet placed next to a pile of sheet metal *automatically* lifts the top sheet into the air, allows fast, safe removal. When this sheet is removed, the following one automatically rises. Ideal for irregular, odd-shaped sheets. Available in five strengths.

MAGNETIC IDEAS FROM ERIEZ



ERIEZ DIP TANK MAGNETS. Here's a handy piece of magnetic equipment designed for fast, sure removal of ferrous materials from tanks, etc. Powerful, permanent magnetic bar element will snap up and hold liberal amounts of metal parts, fine iron particles, etc., from dip tanks, plating tanks, hydraulic system oil reservoirs, acid baths, vapor degreasers, heated ovens, etc. Runners make it exceptionally easy to maneuver on tank bottoms. Standard models are all-stainless steel construction with handle length up to 8 feet. Approximate weight: 16 pounds.

ERIEZ MAGNETIC AGITATOR DRUMS. Here's the unit designed to eliminate slow, costly separation of magnetic from non-magnetic materials. Easily installed at the discharge end of spouts, screw conveyors, gravity flow chutes, etc., the powerful action of the drum's specially located Alnico V elements automatically separates the material as fast as it is fed to the drum. Ideal installation for sand blast reclamation, chip material separation, and wherever there is a high concentration of medium sized ferrous material.

ERIEZ MAGNETIC FERROUS CLEANER. Designed to magnetically remove fine iron contamination from liquids, the Eriez Ferrous Cleaner is a lightweight, portable non-electric separator that can be placed at more than one convenient place in a processing line. Thin flows of powder can also be cleaned of iron if the unit is used in conjunction with a vibrating feeder. Adjustable gate controls the rate of feed onto the chute and magnetic grid. Removable grid with 124 magnetic fingers is easily cleaned. Effectively prevents rust spots and product spoilage.

Eriez "Magnetic Ideas" can help you. Eriez factory-trained field men, backed by extensive laboratory and engineering know-how, will be happy to study your particular metal handling problem and offer helpful "Magnetic Ideas". Our representatives are always glad to work with your engineering department or consulting engineers on any problem, large or small. For additional information concerning magnetic problems in the metalworking industry, write for new bulletin B-207. Address Eriez Manufacturing Company, 100X Magnet Drive, Erie, Pennsylvania.

Ferroalloy Prices

(Effective Oct. 25, 1955)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd, 67-71% Cr, .30-1.00% max. Si.

0.02% C	38.50	0.20% C	35.50
0.06% C	36.50	0.50% C	35.25
0.10% C	36.00	1.00% C	34.00
0.15% C	35.75	2.00% C	33.75

4.00-4.50 C, 67.70% Cr, 1-2% Si 26.25
3.50-5.00% C, 57-64% Cr, 2.00-4.00% Si 25.00

S. M. Ferrochrome

Contract prices, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	28.65
Ton lots	30.55
Less ton lots	32.05

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 3¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.27
0.50% max. C	1.27
9 to 11% C, 88-91% Cr, 0.75% Fe..	1.36

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 8-in. x down, per lb of Cr, packed.

Carloads	41.85
Ton lots	46.15
Less ton lots	48.65

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.

30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	22.95
Ton lots	25.25
Less ton lots	26.75

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	23.05
Ton lots	24.95
Less ton lots	25.95

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ⅛ in. x 12 mesh.

Ton lots	19.65
Less ton lots	20.90

V Foundry Alloy

Cents per pound of alloy, f.o.b. Susquehanna Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	16.60
Ton lots	18.10
Less ton lots	19.35

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	17.50
Ton lots to carload packed	18.25
Less ton lots	19.50

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	9.50
Clairton, Pa.	9.50
Sheridan, Pa.	9.50
Philo, Ohio	9.50

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	12.10
Ton lots packed	14.30

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$86.00
19 to 21%	3% max.	88.00
21 to 23%	3% max.	90.50

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.00
Ton lots	43.50

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	30.00
Ton lots	32.00
250 to 1999 lb	34.00
Premium for hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ... 21.85

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	32.00	33.35	35.05
0.17% max. C	29.95	31.80	33.80
0.15% max. C	28.45	30.30	31.50
0.30% max. C	26.95	28.80	30.00
0.50% max. C	26.45	28.30	29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	23.45	25.30	26.50

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢.

Carload bulk	11.20
Ton lots	12.65
Briquet contract basis carloads, bulk, delivered, per lb of briquet	12.70
Ton lots, packed	14.90

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $90.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $90.50. Add $1.00 per ton for each additional 0.50% Si up to and including 17%. Add $1.45 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96.50% Si, 2% Fe	23.75	21.45
98% Si, 1% Fe	23.25	21.95

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	6.75
Ton lots, packed	9.35

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.

50% Si	11.75	75% Si	15.40
65% Si	14.50	85% Si	17.10
		90% Si	18.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$3.05	$2.95	$3.75
Less ton lots	3.40	3.30	4.55

Ferrovanadium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.

Openhearth	3.10
Crucible	3.10
High speed steel (Primos)	3.30

Alsifer, 20% Al, 40% Si, 40% Fe, Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.35¢
Ton lots	11.50¢

Calcium molybdate, 46.3-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.28

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$6.90
Less ton lots	6.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb con't Cb plus Ta.... $4.65

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.46

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton..... $90.00
10 tons to less carload..... $110.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots..... $1.50

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton..... $177.00

Ferrotungsten, ¼ x down, packed, per pound contained W, ton lots, f.o.b..... $3.45

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. $1.27
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.24

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk lump	15.50¢
Ton lots, packed lump	16.75¢
Less ton lots, lump packed.	17.25¢

Vanadium oxide, 86-89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.33

Zirconium: contract basis, per lb of alloy

35-40%, f.o.b. freight allowed, carloads, packed	26.25¢
12-15%, del'd, lump, bulk-carloads	8.50¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed. B, 3.14%, Si, 40-45%, per lb contained 2.... $5.25

Bortam, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound....	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed
Ton lots per pound ..... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50%, max. Al, 0.50% max. C, 1 in. x D, ton lots.... 1.20
F.o.b. Wash., Pa.; 100 lb up

10 to 14% B	.85
14 to 19% B	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over

No. 1	$1.00
No. 79	50¢

Manganese-Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	$1.46
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots..... $2.05

Silcas, contract basis, delivered.
Ton lots ..... 45.00¢

100X Magnet Drive, Erie, Pennsylvania.

This announcement is not an offer of securities for sale or a solicitation of an offer to buy securities.

October 11, 1955

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Copperweld Steel Company

Common Stock

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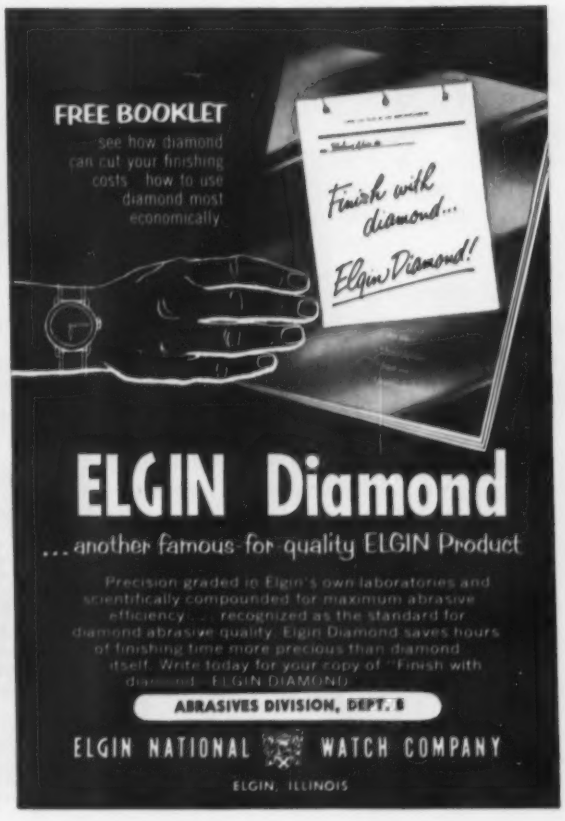
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THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Sales Cheer Coast . . . Bustling sales in a fast-growing market. That's what's ahead for West Coast used machinery dealers.

An IRON AGE survey of dealers here finds most are very optimistic. And with good reason. Through 1955, and a good way into 1956, they see: (1) increasing metalworking activity and (2) many millions of dollars earmarked for new and expanded plants.

With people flocking westward, metalworking companies here are plenty busy supplying needed products and parts for home and factory. Big West Coast industries are going great guns. Aircraft, automobile assembly, electrical equipment and machinery, guided missiles, electronics all are booming.

Hit New High . . . Plant expansions are at an all-time high. As more and more new machines are installed, dealers look to get a lot of late-model used equipment in good condition.

As yet, however, not many used machines are reaching the market. Companies with used tools to sell are holding out for higher prices—especially such fast movers as lathes, drill presses, sheet metal equipment.

This shouldn't last long, dealers say. As new and expanded plants get rolling, the old equipment will be pushed on the used market and not left to take up valuable floor space.

See Broad Demand . . . Demand is good for almost every type and size machine. Dealers are able to supply what most customers need. Only an occasional machine tool now has to be picked up in the East.

In the Los Angeles area, sheet metal equipment is the number one seller: punch presses, shears, brakes. Aircraft industry is the biggest single customer. Increasing demand, however, is noticeable from these industries: electronics, housing equipment, automotive parts.

Small and medium size welders move along nicely. But big ones are still a drag on the market.

Bay Bustles . . . Used machinery dealers in the San Francisco Bay Area are feeling pretty good these days. They say business is good, supply is adequate, prices are right—and best of all—people are buying.

Modern stuff is selling best. Horizontal boring mills, regular milling machines, and good lathes are swift movers. Production equipment items are dull.

Although one dealer said supply "is plentiful," another agreed only with the qualification "if you do a lot of searching and scratching." Prices are holding steady, as they have been for about the last year, on standard equipment. Production equipment prices are soft.

Strong Finish Sure . . . No one checked by THE IRON AGE doubts the industry in the San Francisco Bay Area will fail to wind up the year with a whirlwind finish. "The final quarter looks good," said one dealer. Another estimated fourth quarter will be about twice as good as same period 1954.

Seattle area is having a temporary slow sales period. Dealers checked couldn't put their finger on any reason—think it's possibly an inventory readjustment.

Lathes are moving well—also sheet metal machinery up to one-quarter inch. But there's a shortage of gear cutting machinery in good condition.

Area's supply is low on good basic machine tools. While there's reasonably good demand for heavy machinery and welding equipment, the tools just aren't available.

CONSIDER GOOD USED EQUIPMENT FIRST

ANGLE BENDING ROLL
No. 3 Niagara Angle Bending Roll
No. 2 Buffalo Angle Bending Roll

BALER
#125-TC Galland Henning, Volume of Box 145 cu. ft., Bale Size 500 to 800 lbs.

BENDING ROLLS
8' x 3/16" Bertsch Initial Type
12' x 5/8" Niles Pyramid Type
10' x 1/4" Bertsch Initial Type Bending Roll
18' x 3/8" Wickes Pyramid Type
20' x 1" Hilles & Jones Pyramid Type Bending Roll

BRAKES—LEAF TYPE
8' x 1/8" Dreis & Krump Size 186
12' x 1/8" Dreis & Krump, Motor Driven

BRAKES—PRESS TYPE
12' All Steel Press Brake, 250 ton Capacity
10' x 3/16" Cincinnati No. 76

CAR PULLER
Clyde Double Drum Electric Car Puller, Capacity 43,750# Max. Starting Pull

CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton P&H	39' Span 230 Volt D.C.
5 ton Northern	56' Span 220 Volt D.C.
5 ton Northern	57' Span 230/3/60 A.C.
5 ton Cleveland	96' Span 230 Volt D.C.
7½ ton P&H	65' Span 440/3/60 A.C.
10 ton Niles	52' Span 230 Volt D.C.
10 ton P&H	26' Span 220 Volt D.C.
15 ton P&H	56' Span 230 Volt D.C.
20 ton P&H	60' Span 230 Volt D.C.
20 ton Toledo	75' Span 550/3/60 A.C.
30 ton Shaw	60' Span 230 Volt D.C.
120 ton Whiting With 10 ton Auxiliary	80' Span 220/3/60 A.C.

DRAW BENCH
50,000# Standard Double Draw, 45' Length of Draw

FORGING MACHINES
1" to 3" Acme, Ajax, National
1", 4", 5", 7½" National High Duty, Air Clutch

FURNACES
Lee Wilson Natural Gas Annealing Furnace, Work Dimensions 42" coil, 96" Piling Height
Westinghouse Belt Type Furnace, Gas Fired, Charge Space 36" dia. x 42" deep
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15 ton Herault Top Charge, With Transformer

HAMMERS—BOARD DROP—STEAM DROP
STEAM FORGING—800 lb. to 20,000 lb.

JIG BORER
#50 Knight Jig Borer, Complete—New 1950

LEVELERS—ROLLER
52" McKay 17 Rolls 3⅜" Dia.
60" Aetna Standard 17 Rolls 4½" Dia.
72" McKay 15 Rolls 4½" Dia.

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350 ton RD Wood Hydr. Joggling Press
500 ton HPM Fastraverse Press, 24" Stroke Pressing Area 36"x36", Max. Daylite 42"
1200 ton Birdsboro 4-Column, 20" Stroke Dist. Bet. Columns 30" x 36", Daylite 42"
1257 ton Baldwin Southwark Forging Press, 30" Stroke Main Ram, 54" x 41" Bet. Columns
2045 ton Birdsboro, 4-Columns, 14" Stroke Platen 42" x 40", Daylite 47"
4500 ton B-L-H Hydr. Forging Press

PUNCH & SHEAR COMBINATIONS
Style MF Cleveland, 36" Throat, Punch 1¼" thru 1" Style W Cleveland Single End, 60" Throat, 312 Ton

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84" Hilles & Jones, Six Rolls 16" Dia., M.D.

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12" x 20" Garrison & W-F Two Stand Two High
12" x 28" Garrison Single Stand Two High
12" x 24" Garrison Single Stand Two High
16" x 34" Farrel F&M Two Stand Two High
20" x 26" Hoagland Single Stand Two High
24" x 44" Garrison Two High Hot Mill

SHEARS—GATE
80" x ¾" Pels

SHEARS—ANGLE
6x6x1" Long & Allstatter Size B

SHEAR—BAR
#9 Buffalo Bar Cutter, Capacity 3" Sq., 3⅝" Rd.
#4 H&J Guillotine, Capacity 3½" Square, 4" Round

SHEARS—ROTARY
3/16" Quickwork Rotary Shear, 36" Throat
¼" Kling #250, With Flanging Attachment
⅜" Quickwork Whiting #04A—NEW 1953
⅝" Kling #750, 48" Throat, Circle Cutting Attach.
1" Kling No. 100, 48" Throat, Joggling Rolls Incl.

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10' x 12 Ga. Niagara No. 501B
10' x ⅜" Niagara Model L-10-⅜

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36" Yoder Slitting Line with Coilers
38" Paxson Coil & Sheet Slitter
38" Custom Built Slitting Line, with Coilers & Leveler

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Kane & Roach 5-Roll, Capacity ⅝" to 1½" dia.
Taylor Wilson Cross Roll, Capy. ¼" to 1⅛" Bars
No. 3 Medart 3-Roll Rotary Straightener Capacity 1" to 3½" bars or up to 4½" tubes
⅝" Hallden #3, With 30 ft. Cut-Off

TESTING MACHINE
5,000, 10,000, 100,000, 200,000# Olsen & Riehle Universal; 50,000 & 200,000# Compression

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A. C. MOTORS
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Qu.	H.P.	Make	Type	Volts	Speed
1	1500	G.E.	MT-485	2300	580
1	1000	A.C.	Mill	2300	360
1	800	G.E.	MT	2300	390
1	700	A.C.		2300	900
1	500	G.E.	MT-413	2200	580
1	500	Whse.	CW	550	350
1	500	G.E.	M-502Z	2300	1180
1	450	G.E.	IE-17B	2200	885
1	400	Whse.	CW-460A	440	1170
1	400	Whse.	CW	440	514
1	400	Whse.	CW-1212	2200	435
1	350	G.E.	MT-442T	2200/4000	258
2	350	G.E.	IM-17A	440/2300	720
1	250	G.E.	MT-424Y	4000	257
1	250	G.E.	MT-5599	2300	1800
1	250	Al. Ch.		550	600
1	200	Cr. Wh.	36QB	440	585
1	200	G.E.	IM	440	435
1	150 (unused)	Whse.	CW	2300	435
2	125	A.C.		440	885
1	125	Al. Ch.		440	720
1	100	G.E.	IM-16	2300	435
1	100	G.E.	IM	440	600
4	100	A.C.	ANY	440	695

SQUIRREL CAGE

1	800	G.E.	KT-573	2300	1180
2	600	G.E.	FT-589BT	440	3570
1	500	G.E.	K-6345-S	2300	1185
2	450	Whse.	CR-1420	2300/4150	854
1	440	G.E.	IE-15B	2300	1165
1	400	G.E.	IK	2200	580
1	200	G.E.	IK-17	440	580
3	200	G.E.	KT-557	440	1800
1	150/75	G.E.	IK	440/265/454	
1	150	Whse.	CR-8548	440	880
1	150	Whse.	CR	440	580
2	125	Al. Ch.	ARW	2200	1750
1	100	Whse.	CR-876C-TEFC	440	710

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1	4350	C.W.	3501-8L	13800/6900	514
2	2000	Whse.		2300	120
2	1750	G.E.	ATI	2300	3600
2	735	G.E.	ATI	2300/13000	600
1	550	Ideal	SM	2300/4160	1800
3	500	G.E.	TS-7567	2200	1200
1	450	Whse.		2200	138.5
1	450	Whse.		2200	450
1	400	G.E.	TS-7565	2200	1200
1	400	G.E.	TS	2200	600

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FERRACUTE SD-703 Double Action Toggle Draw Press 700 Ton Cap., Bed Area 60" F.B. x 72" L.R., Stroke of Plunger 48", Stroke of Blank-holder 20", 100 H.P. Motor.
BLISS No. 88 Straight Side Single Crank Press, Capacity 255 tons, Bed Area 30" & 29", 18" Stroke of Slide, Marquette Air Cushion.
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1—36" x 192" ROLL GRINDER with motors and controls.
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16—AJAX electric induction melting furnaces, 2000 lbs. each.
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1—500 HP MOTOR, 120 RPM, 2200/3/60 with control.
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Late Type 12" x 48" Landis Type C Universal Hydraulic Cylindrical Grinder Ser. #17898

(2) 24' x 8' x 10" Thick T slotted Floor Plates

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No. 2 Cincinnati centerless, flimatic.
40" No. 16A2 Blanchard 2-spd. rotary, new 1946.
72" Colonial broach grinder. Late
72" Hanchett 3-spd. rotary surface, new 1946
12" x 48" Norton universal cylindrical, late.
16" x 96" Landis gap type cylindrical, new 1941.
13" x 60" Model 300 Hanchett vert. spdl., late.
10" x 24" Cincinnati hyd. universal cyl., flimatic.

HAMMERS
No. 0-1 Nazel, pneumatic, late.
No. 5N Nazel, self-contained.
No. 6B Nazel, self-contained.

LATHES
No. 5 Jones & Lamson ram type univ. turret
14" x 8' Hendey Toolroom, 1940.
18" x 50" Lipe Carbo-Matic, 1942.
9" x 18" Hendey Pro. Tool & Gauge, 1940.

MILLS
1-18 Cincinnati production.
Model 2-20 Kent-Owens hyd. mill.
1-2-3-4-5-6 knee type plain & vertical.
60" x 48" x10' Ingersoll adj., rail planer type.
No. 2H K & T plain horiz., new 1942.

PLANERS
36" and 60" Rockford Hyd. Openside Shaper-Planers
48" x 48" x 10' Gray Mazi-Service.

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113 ton No. 79 Toledo gap frame, S.S.
280 ton No. 79½-72 Toledo D.C. Toggle drawing.
350 ton 90"No. 4090 Bliss D. C. Toggle drawing, 409C.
500 ton No.1030 Hamilton D.C. adj. bed, 60"x102".
545 ton No. H36121/2 Hamilton Forging Press.
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24" Rockford "Hy-Draulic" universal.
32" G & E Invincible, F.M.D., late type.

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2" National Upsetter.
3½" Ajax, suspended slides, steel frame.
5" Ajax suspended slides, steel frame.

1000 Tools in Stock

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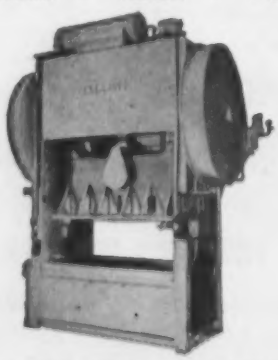

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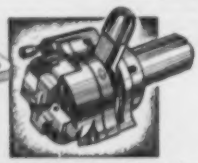
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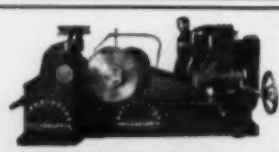
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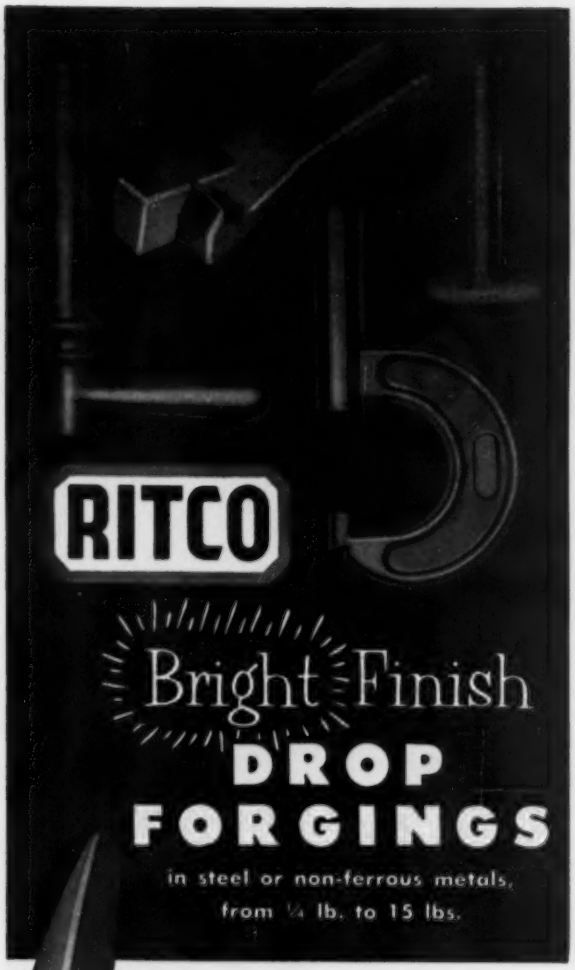

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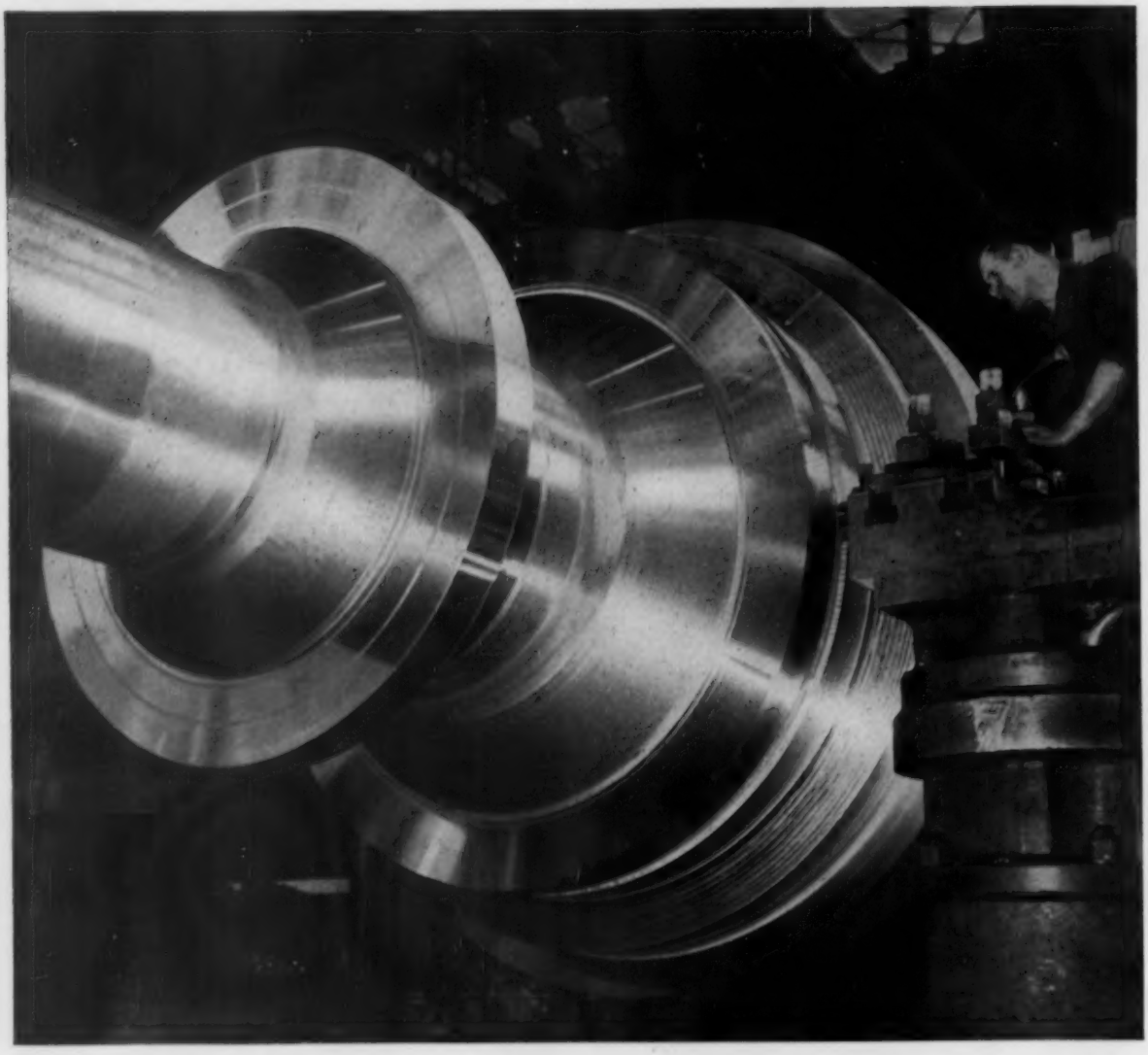

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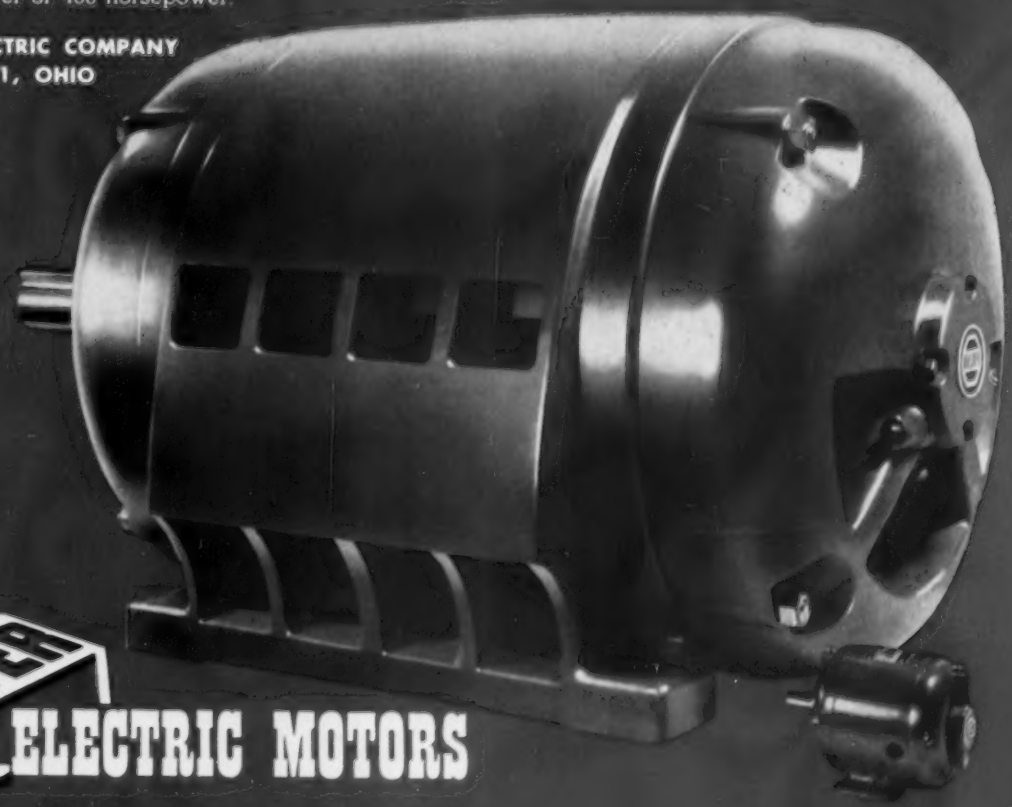

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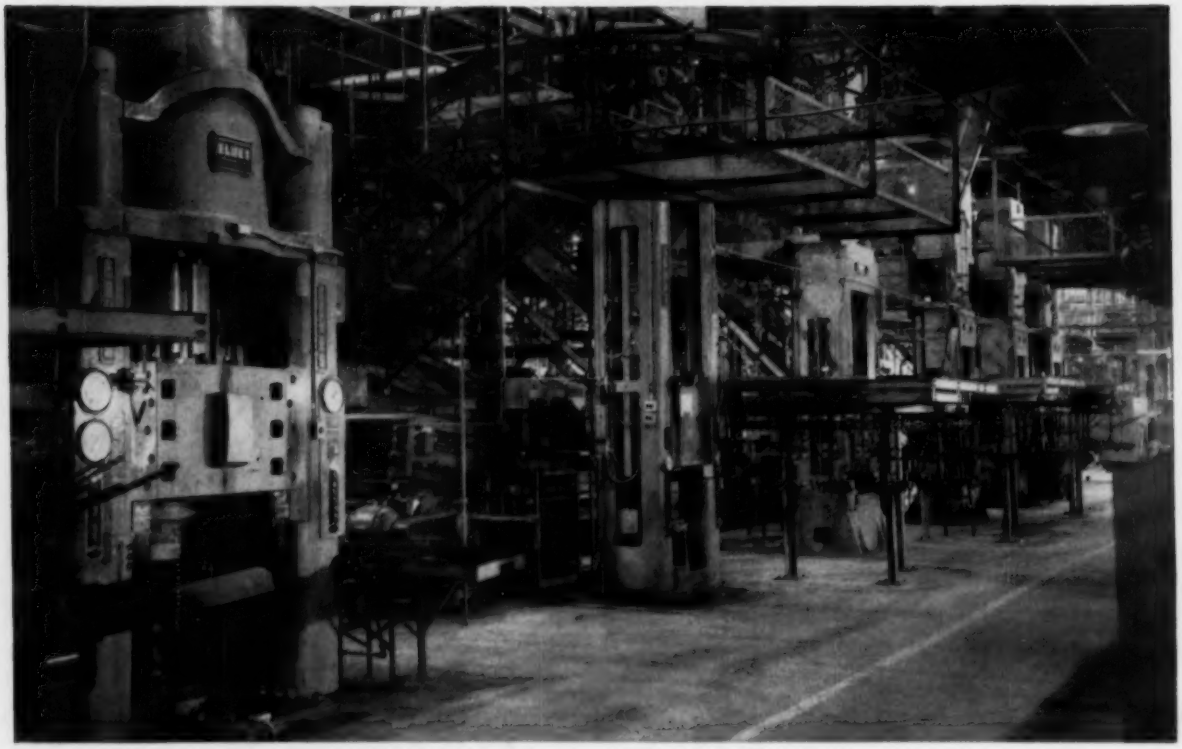

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1st Draw	150 ton	Head	2500 ton
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